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A TREATISE

ON

CONTINUED FEVER

AND ITS

MODIFICATIONS.

BY

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The following pages contain the Treatise on Continued Fever, written for the Cyclopædia of Practical Medicine. It is re-printed in accordance with the wish of a few friends, who are desirous of having it in a separate form.

Ely Place,
August 1, 1832.

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A TREATISE,

&c. &c.

CHAPTER I.

General Observations—Explanation of the Nomenclature of Fever—Antient Doctrines of the Nature of Fever: Humoral Pathology—Modern Doctrines: Solidism: Locality of Fever: various Theories: Hoffmann, Stahl, Cullen, Brown, Ploucquet, Marcus, Broussais. Petit, Serres, Bretonneau, Pinel, Rasori,—and the Italian School.—Fever arises from Disease either of the Solids or of the Fluids.

The word *fever*, derived from the Latin term *febris* (a derivative of the verb *ferveo* or *ferbeo*, signifying *to be hot,*) is applied to a class of diseases characterised by morbid heat of skin, frequency of pulse, and disturbance in the various functions.

In the Greek language, the word πυρεξία (from πῦρ, *fire*) expresses fever; hence the origin of the term *pyrexiæ*, under which the ancient writers comprehended *fevers* and *inflammations*, a classification which has been retained by modern nosologists. It therefore

appears that upon one symptom alone, *increased heat*, the nosological distinction of a very numerous and important class of diseases has been founded. Though this characteristic feature is very generally observed, nevertheless in some cases of fever, strictly so called, the heat of skin is not above the natural standard, sometimes even below it; from this circumstance, therefore, it is evident that other phenomena are necessary to constitute a febrile disease.

We know so little about the cause of the generation of animal heat, that no satisfactory explanation of its increase or diminution in fever has been given: it seems probable, however, from some experiments, that its evolution is intimately dependent on the condition of the brain and nervous system, and until physiological investigations shall unfold with greater certainty the mode in which animal heat is generated, the pathologist must be satisfied with the ultimate fact, that in febrile diseases there is generally, among other phenomena, increased heat.

There are some diseases, the symptoms of which are so characteristic, and so invariably present, that there is little difficulty in determining their precise nature and seat. The various organic inflammations—of the brain, lungs, intestines, &c.—are examples of this class: there are others of which the precise locality is either so varied or obscure, either as regards the symptoms during life, or, in many instances, on dissection after death, that we are

unable to discover their nature. To this latter class fever properly belongs. It is true that in most cases of fever we can discover the existence of certain lesions, but these are too vague or indefinite to enable us uniformly to decide on the primary seat of the malady. It is more than probable that in what is usually called *idiopathic fever* there is alteration either of the solids or fluids, although its precise locality cannot in every case be detected; but without disease in either the one system or the other, we maintain that fever cannot exist.

It is too generally imagined that the primary disease which induces fever is essentially local inflammation. The application of this doctrine to the early stage of fever, we hold to be not only at variance with facts, but dangerous as to the practical deductions to which it leads. We know that irritation, far short of inflammation, is sufficient to excite feverish indisposition, more particularly at those periods of life at which the vascular system is easily excited by apparently trivial local or sympathetic disturbance, (for example, in infancy or childhood by dentition or intestinal irritation,) and that this feverishness disappears when the cause is removed. The paroxysm of an intermittent is induced by the peculiar effect of a malarian poison; in this disease, the whole phenomena of fever are well marked, but certainly few will maintain that the febrile disturbance is the consequence of local inflammation. There can be little doubt that the error alluded to may in a great measure be imputed to the attempts to

discover the cause or nature of fever in the various local lesions which are observed in fatal cases.

On the other hand, the important fact should ever be kept in view, that the primary disorder, whatever it may be, passes readily into inflammation, and that the lesions which arise in the progress of fever constitute the principal source of danger, and are in many instances the more immediate cause of death.

If we trace the early records of medicine, we find that the nature of fever has afforded ample field for discussion from the time of Hippocrates to the present day. Both the solids and fluids have been investigated, and arguments adduced in support of the opinion, that a morbid condition of either the one system or the other was the cause of fever.

The ancients possessing a very scanty knowledge of anatomy, either in its healthy or morbid state, and the secretions being evidently vitiated in the progress of fever, it was natural that a morbid condition of the fluids should, in the early ages of medicine, be considered as its primary cause. The humoral pathology was accordingly received as the only explanation or theory of fever, for many centuries. We find the early medical writers entertaining the idea, that the system waged war against something noxious within itself, and that in the attempt to expel the offending agent, a violent commotion was excited. By this plausible theory, the duties of the physician were restricted to assisting nature in her

efforts to get rid of what was deemed injurious to the welfare of the body: in fact, fever was imagined to be a natural and salutary process, indispensably necessary to throw off whatever was noxious, whether generated within the body, or introduced by external causes. Some theorists, in their anxious desire to support this doctrine, endeavoured to deduce the term fever from the Latin verb *februare*, signifying to purge or purify, and by those who implicitly believed in this theory, the derivation was no doubt considered apt and appropriate. The application of the doctrines of the humoral pathology in explanation of the phenomena of fever, received much apparent confirmation from the circumstance, that in eruptive fevers, after more or less febrile disturbance, various eruptions appear on the skin. It was rendered still more imposing, when the chemical doctrines of Paracelsus and Van Helmont were first promulgated. These chemical philosophers imagining that in fevers the fluids possessed at one time an alkaline, at another an acid quality, conceived that an effervescence took place, which gave rise to a febrile paroxysm—an assumption which led to not a few fatal practical errors.

The idea that particular forms of fever depend on a morbid state of the fluids has been maintained by many pathologists in more recent times. The vital fluid has been subjected to chemical analysis with the object of ascertaining the comparative difference in its component ingredients during fever: these researches

tend to shew, that previous to the attack, the blood is materially altered in its properties, and that its constituent principles undergo progressive changes, as the disease proceeds.

This department of chemical pathology has been lately much elucidated by the experiments of Dr. Clanny, detailed in his published lecture on typhus fever, and also by the observations of Dr. Stevens, who states that on opening the heart in fatal cases of yellow fever, he found, instead of blood, a dissolved fluid nearly as thin as water and black as ink. In both sides of the heart the fluid was equally black, and throughout the vascular system all distinction between venous and arterial blood was completely lost. Dr. Stevens supposes that when the blood is found in this state, it is entirely deprived of its stimulating properties, and therefore unable to excite the heart or to support life. It is affirmed, also, that the changes in the blood take place in a certain determinate order. It first loses its solid parts and becomes thin; it is then deprived of its saline principles, and becomes black and vapid; and lastly, from its preservative elements being destroyed, it loses its vitality so as to be incapable of supporting life.

Dr. Stevens considers this diseased state of the blood as the first link in the chain of the morbid phenomena which constitute fever. He believes that the aerial poisons from which all pestilential diseases arise are attracted with the atmospheric air into the circulation, mix directly with the blood in the pulmonary sys-

tem, and that this poisoned or diseased state of the whole circulating current is the cause of the subsequent morbid action in the solids. Similar views, with respect to the pathology of fever are gaining ground in France, in which country the doctrines of solidism have almost exclusively prevailed.

The study of the structure and functions of the human body, in its healthy as well as in its morbid state, being the most satisfactory method of investigating the nature of disease, and lesions having been discovered in various organs in those who have died of fever, the attention of pathologists has in later times been directed to the state of the solids, in the hope that the origin of fever might be discovered.

The locality of the disease, however, has been most warmly disputed; indeed there are few organs of the body which have not been fixed on as the seat of fever; from which it may be inferred, that the doctrines of solidism are as little likely as those of the humoral pathology, to explain every variety of this inscrutable disease.

The functions of the brain being almost invariably affected in fever, it was to be expected that the solidists would endeavour to trace its origin to the nervous system. We accordingly find, that towards the close of the seventeenth century, Stahl maintained that the phenomena of fever were the result of a general commotion in the system, in its endeavour to throw off a spasm induced by torpor of the

brain and nervous system. This explanation, which, after some modifications, was adopted by Hoffmann, was the first attempt to assign to the brain an important share in the pathology of this disease. It formed the basis of the theory invented by Cullen, who believed that in fever certain causes produced collapse or diminution of the energy of the brain. The effect of this on the voluntary muscles and extreme vessels was universal debility, and spasm or constriction of the capillaries: the subsequent reaction of the sanguiferous system, however, was supposed to have the effect of resolving the spasm, and consequently removing the fever. The prominent importance the Edinburgh Professor assigned to the fictitious debility which was imagined to result from this unknown condition of the brain, notwithstanding his theory that there was an inherent protective power in the system by which this fancied weakness was to be overcome, has been followed by serious practical errors, by abstracting the young and inexperienced mind from the more acute forms of fever, and from those important local complications which very frequently take place in its progress. Besides, as Dr. Parr has remarked, in this system the production of spasm by debility is an isolated fact without a support, and the introduction of the *vis medicatrix naturæ* is the interposition of a divinity in an epic, when no probable resource is at hand.

It is evident that in the definition of fever given by Cullen in his nosology, he expressly discountenances the idea of primary local dis-

ease; consequently he only partially adopted the doctrine of solidism, his theory merely implying that the various exciting causes act primarily on the brain.

This doctrine prevailed not only in British but in many continental schools, till Dr. Brown, evidently to gratify a feeling of resentment, opposed it with great bitterness. He invented and publicly propounded with much plausibility an opposite theory, which had the merit of great simplicity. According to Brown, the living system is an organized machine endowed with an inherent principle of excitability, arising from a variety of internal and external stimuli, and from which the excitement which constitutes the life of the machine is maintained. Upon these principles he founded the character and mode of treatment of all diseases, which were supposed to consist but of two families, the *sthenic* and the *asthenic*; the former produced by accumulated, the latter by exhausted excitability, and marked by indirect debility. The remedial plan was as simple as the arrangement. Bleeding, low diet, and purging were employed to cure the sthenic, and stimulants, of various kinds and degrees, the asthenic diseases.

Fevers, therefore, under this hypothesis, like other diseases, are either sthenic or asthenic, as they are the result of accumulated or of exhausted excitability. This doctrine obtained few adherents in the British schools, though, as we shall presently notice, it prevailed extensively

for a time in several parts of the continent, more particularly in the north of Italy.

Another class of solidists asserted that inflammation of the brain was the cause of fever. Ploucquet, who appears to have first taken this view, admitted, however, that from particular circumstances, other organs became occasionally implicated. Though this theory evidently implied that fever was dependent on local inflammation, it gave the disease a wider range—it assumed inflammation of the brain to be the source of fever, but that from the operation of certain causes, other irritations were in some instances superadded. Marcus and Clutterbuck have subsequently adopted this view, and have severally adduced arguments in its favour. Admitting, however, that the various exciting causes of fever do in some instances exert their action on the brain, we have no evidence that they produce, in the first instance, inflammation in this organ: on the contrary, the symptoms denote that the nervous system has only received a peculiar and powerful impression. When, on subsequent reaction taking place, a general impulse is given to the circulation, and the nervous system is roused from its depression, inflammation of the brain does frequently take place, especially in young plethoric subjects, just as it may supervene in any other organ to which, from causes hereditary or acquired, the individual may be predisposed. It should also be impressed on those who are inclined

to adopt this doctrine, that although in a considerable proportion of persons who die of continued fever, the membranes, and frequently the substance of the brain, bear unequivocal marks of inflammation, yet such morbid appearances are by no means invariably observed.

We are next to advert to the doctrine which ascribes the phenomena of fever to primary affection of the intestinal canal. Lesions of the intestines in fatal cases of fever had been long ago pointed out by those who devoted much attention to the study of morbid anatomy. Bonetus stated that on dissection of persons who died of malignant fever, he found the stomach and intestines inflamed. Bartholinus made a similar observation; and in the works of Sydenham, allusion is made to ulceration of the intestines in continued fever. Subsequently Rœderer and Wagler* published a description of an epidemic mucous fever which prevailed at Gottingen, in which the appearances which were found after death in the alimentary canal are minutely detailed.

From these statements, it appears that the morbid appearances in the alimentary canal had attracted the attention of pathologists long before the promulgation of the theory in France, that fever was the result of inflammation of the mucous membrane of the intestines. This view, which was first maintained by Broussais more than twenty-five years ago, has become the prevailing opinion in France,

* De Morbo Mucoso, Goettingæ, 1762.

though it has gained comparatively few proselytes in other countries.*

Those who maintain the physiological doctrine of Broussais, contend that fever is entirely symptomatic of irritation or inflammation of the mucous membrane of the intestines. The leading principle of this theory is, that every irritation which is capable of producing an impression on the brain is reflected by this organ on the mucous membrane of the bowels. Broussais applies it to other acute diseases; for instance, in small-pox or measles, the inflammatory excitement by which they are accompanied is supposed to be first conveyed to the brain, and afterwards reflected on the mucous membrane of the intestines, and that thus inflammation (gastro-entérite), the supposed cause of these eruptive fevers, is produced.

It is affirmed that inflammation and its consequences are invariably found in the mucous lining of the intestines on examination of persons who have perished from fever, and that the treatment which is founded on this view is the most successful. Broussais, indeed, asserts with unparalleled boldness, that the tables of mortality declare in favour of the new doctrine, and that its influence on the population would be more favourable than vaccination itself.

* Examen des Doctrines Médicales et des Systèmes de Nosologie, &c. Par F. J. V. Broussais. Prop. de Méd. cxxxviii. cxxxix.

Though Rœderer and Wagler, Prost,* Baillie,† and others had previously detected morbid appearances in the bowels in their dissections of persons who had died of fever, the theory of Broussais, that inflammation of the mucous membrane of the intestines is the cause of fever, had the effect of directing the attention of pathologists still more particularly to the condition of the intestines in this class of diseases. In 1813 M. Petit and M. Serres‡ published the account of a disease, very frequent in Paris in 1811, 1812, and 1813, which they called entero-mesenteric fever, and which was characterised by all the symptoms of continued fever, but originated apparently in certain changes in the inferior portion of the small intestines and ileo-cæcal valve, accompanied with enlargement and suppuration of the corresponding glands of the mesentery. The precise anatomical lesion of the intestines, however, was not ascertained by these laborious pathologists, but subsequently by M. Bretonneau of Tours,§ who, after investigating the subject with great mi-

* La Médicine éclairée par l'ouverture des Corps.

† Morbid Anatomy.

‡ Traité de la Fièvre Entéro-Mésenterique observée, reconnue, et signalée publiquement a l'Hôtel Dieu de Paris dans les années 1811, 1812, et 1813, par M. A. Petit, l'un des Médecins du dit Hôpital, composé en partie par E. R. A. Serres, &c.

§ Trousseau, de la Maladie à laquelle M. Bretonneau a donnè le nom de dothin-entérite. Arch. Gén. de Méd. X. 67, 1826.

nuteness, came to the conclusion that the primary source of fever was in the conglomerated mucous follicles, or glands, situated in the lower portion of the ileum and solitary glands of the cæcum.

A most full and elaborate work has been lately published by M. Louis,* in which the pathological views of Petit, Serres, and Bretonneau as to the primary seat of fever are confirmed. This author, moreover, has given a most minute account of the various secondary lesions which supervene on this supposed primary intestinal disease.

These views of the nature of fever now prevail almost exclusively among the French pathologists. Mild fever is supposed to arise from gastro-enteritis alone, the various forms which it occasionally assumes being regarded as gastro-enteritis, with particular complications. For instance, inflammatory or ardent fever (a form rarely observed) imports an intense degree of this lesion; the adynamic (typhus mitior) is regarded as gastro-enteritis which has assumed such a degree of intensity that the general powers decline, while the intellectual functions are more or less disturbed. The more malignant forms of fever (typhus gravior) are supposed to be gastro-enteritis complicated with irritation of the brain, from sympathy with the state of the alimentary

* Récherches Anatomiques, Pathologiques, et Thérapeutiques sur la Maladie connue sur les noms de Gastro-Entérite, &c. par P. Ch. A. Louis, M.D.

canal; and when fetor of the breath, perspiration, and stools are observed, the disease becomes what has been termed putrid fever,—that is, putrid symptoms are superadded to the primary gastric inflammation.

It cannot, however, be conceded that in every form of fever this local disease does exist, as it has not been universally, nor even in the majority of instances, discovered on the most minute examination of the intestines in fatal cases. The more probable inference is, that this gastro-entérite, or follicular disease, occurs only occasionally, and that it is much more common in some places than in others. We know that it is observed more frequently in the fevers of France than in those of Britain; very rarely, if ever, in the epidemic fever of Ireland; and that it is only occasionally met with in the epidemic visitations in the northern districts of England and Scotland.

From its being observed in a greater proportion of cases in London and Manchester, it is probable that there are some local causes or circumstances in particular places which produce this intestinal affection. Whether in those cases in which it has been found after death, (for we maintain that the pathognomonic or diagnostic symptoms by which it has been supposed to be indicated are by no means uniform or satisfactory,) it be the cause or effect of the febrile symptoms by which it is accompanied, is still a question about which there is great difference of opinion, though the majority of British physicians regard these in-

intestinal lesions as only the sequelæ or consequences of fever.

The assertion that the treatment founded on the gastro-enteritic pathology is the most successful, is only an assumption; indeed, it may be fairly inquired how many hundreds annually survive the treatment calculated to increase gastric inflammation—how many are daily stimulated with bark, wine, and ammonia, and yet recover? Besides, how can this doctrine be applied in explanation of the phenomena of intermittent fever? In France as well as in this country, periodic fevers are successfully treated by stimulants—bark, and even arsenic; not to allude to the complete suspension of the febrile paroxysm for twenty-four, forty-eight, seventy-two hours, or even longer.

These circumstances, when duly weighed, must in our opinion disprove the general conclusion, that every form of fever is the result of gastric inflammation. On the other hand, we are bound to admit the occasional existence (more frequent in some localities than in others) of the various intestinal lesions, which have been so minutely and elaborately described by the French pathologists, to whom, if this discovery be not entirely due, the merit must be conceded of having, with indefatigable labour, followed up the few hints which previous writers had thrown out, and thus brought to perfection one of the most important pathological facts connected with the morbid anatomy of fever.

The celebrated Pinel took a more extended view of the nature of fever than any preceding writer of the continental school. He distinguished symptomatic from primary or essential fevers, and comprehended under this latter class, acute diseases in which there is a quick pulse, hot skin, and disorder in the various functions, the symptoms being independent (as he supposed) of local disease. While he admitted, however, in his classification, the existence of fevers without primary disease in any organ, he evidently localised the varieties when he stated that the seat of inflammatory fever *(angeio-tenic)* was in the organs of circulation; that the origin of bilious fevers *(meningo-gastric)* was in the mucous membrane of the intestines; that a particular form of gastric fever *(adeno-meningeal)* depended on disease of the mucous follicles alone; that in another variety *(ataxic)* the brain and nervous system were chiefly affected; another type *(adynamic)* being characterised by great prostration or depression of the vital powers, and often complicated with symptoms which have been usually referred to putridity.

These views have been since partially adopted, and have evidently given origin to the doctrine entertained by a large proportion of physicians of the present day, that fever is an essential disease, that is, the symptoms are independent of primary organic lesion; though it is admitted that in the majority of cases, local inflammations become developed

in its progress, and constitute the principal source of the severity or danger of the disease.

The doctrines of Brown, which had obtained, as we have stated, comparatively few converts in his own country, made a strong impression in the north of Italy. Rasori, who had visited the medical school of Edinburgh, was so enamoured with the Brunonian system, that, on his return to Italy, he published a compendium of this system, (to which the learning and ingenuity of Darwin had given a new impulse,) as well as a translation of the celebrated Zoonomia of Darwin.

A few years afterwards, however, a petechial fever appeared at Genoa, in which the stimulating treatment recommended by Brown was evidently so injurious and positively fatal, as to induce Rasori to reconsider the theory. He then became convinced of its inconsistency and error, and ultimately acknowledged this conviction in an account which he published of the epidemic of Genoa.* This epidemic, from whatever causes it arose, had many of the characters of what Brown termed an *asthenic* disease, and was consequently treated by stimulants. From the numbers who perished under this plan, and from observation of its symptoms and progress, during which local inflammations not unfrequently occurred, Rasori was induced to substitute a modified anti-

* Storia della Febre Petechiale di Genova. Del Profess. Giovanni Rasori.

phlogistic, or, according to the language of the Italians, a *contro-stimulant* treatment.

Bloodletting in the commencement of the disease, when the patient was young and vigorous and when the symptoms demanded it, was found decidedly beneficial; and in less severe cases, saline purgatives, antimonials, (more especially the tartar emetic in liberal doses,) and acidulated drinks were employed.

These remedies, with blisters in the advanced stage, stimulating friction to the abdomen with the view of allaying the gastric irritation, light bed-clothing, and rigorous diet, constituted the treatment employed in the epidemic.

This change of Rasori's opinions produced a considerable sensation, and had the effect of overturning the leading principles of Brown's system in Italy. The professors in the north of Italy, who were formerly attached to Brown's views, taught the doctrines of Rasori with some unimportant modifications, and ultimately several works emanated from the different universities, explaining the leading principles of the "Doctrine of Contro-stimulus," or as it was afterwards termed, the "New Medical Italian Doctrine." As it would lead to digression, we must refer those who wish to obtain information on the Italian doctrines to the several works alluded to.*

* Primæ Liniæ Materiæ Medicæ, Auctore Syrus Borda.—Della Nuova Medica Italiana, Proluzione alle lezione di Clinica Medica nella P. Universita

Tommasini, whose learning and reputation rank him as a leading authority of the Italian school, considers fever to be the immediate result of a morbid condition of some internal organ; and in this he is followed by a large majority of the Italian physicians.

Others, however, adopt the views of Rubini, and ascribe the phenomena of fever to the effect of a contagious principle absorbed into the circulation, which, after producing inflammatory action, gives rise to symptoms indicating failure of the powers of the system. The antiphlogistic treatment is consequently pursued in the commencement of the fever, and afterwards a stimulant plan, when the powers of the system appear to give way.

The doctrines of Broussais have also obtained a few though inconsiderable number of adherents in Italy, so that we find the views of this celebrated pathologist are much more generally received in France than in any other country.

In our opinion, both essentialists and localists have taken a much too limited view of the etiology of fever. It appears to us that fever, whatever be its form, depends on some mo-

di Bologna per l'anno Scholastico, 1816-1817. Del Professore Giacomo Tommasini.—Dell' Inflammazione et della Febre Continua; considerazioni Patologico-Pratiche. D. G. Tommasini, Pisa, 1820. —Del Metodo di curare, &c. Del Profess. Giacomo Tommasini. Bologna, 1821.—Lezioni di Terapea Speciale sulle Inflammazione, e Rendiconto Clinico, di V. Mantovani, Pavia, 1820.—Institutiones Pathologicæ. Auctore, F. A. Fanzago.

dification of one or other of the elements which enter into the composition of the human body, or in other words, that it follows as a consequence of a morbid condition of either the solids or fluids.

We know that, when the function of any organ becomes seriously disturbed, more particularly if inflammation arise, fever is induced. It is probable that the various external causes, terrestrial or atmospheric poisons for example, induce fever by their action on particular parts, in the same way as the different poisons are known to affect particular structures. On this principle the symptoms peculiar to some epidemics may be explained; for instance, catarrhal fever, in which the mucous membrane of the air-passages is affected; or gastric fever, in which a peculiar impression seems to be made on the mucous lining of the intestines.

We shall endeavour to shew, in treating of the pathology of the fluids, that the blood is not only materially changed in fever, but that the diseased state precedes the attack, and that the changes take place in a determinate order. This view is corroborated by Andral, who states " that the fever termed *inflammatory* seems often to arise from no other source than the blood being too rich in fibrine; in like manner, an impoverished state of the blood, whether accidental or natural, is often connected with *mucous* fevers, and with those characterised by a sudden sinking of the vital powers; and that the source and primary seat

of *typhous* fevers, properly so called, is proved to be in the blood, inasmuch as they are caused by the introduction of deleterious substances, such as animal or vegetable effluvia, into that fluid."

It is in this way only, by the blood becoming contaminated and in this state circulating through the system, that fever can be supposed to be, according to the language of Dr. Fordyce, "a general disease which affects the whole system, the head, the trunk of the body, and the extremities; the circulating, absorbing, and nervous systems; the skin, the muscular fibres, and the membranes; the body and likewise the mind." *

When putrid substances are injected into the blood of the lower animals, this fluid loses its power of coagulating, and acquires a rapid tendency to decomposition: great sensorial disturbance, convulsions, delirium, hurried breathing, and bloody exhalations also take place, followed by speedy death; and if the poison injected be highly concentrated, the animal is almost instantly destroyed.

The effects which follow from the use of food of an unwholesome quality, or from an insufficient quantity of food, are probably owing to the changes which the blood undergoes from these causes; hence scarcity may act both as a predisposing and exciting cause of fever. In this way, the origin of the disease in times of general distress among the poor is readily ex-

* Dissertations on Fever.

plained; and the history of epidemic fevers in Britain shews the intimate connexion that has always subsisted between scarcity and fevers of a low or malignant type.

It is also extremely probable, that in fevers which are produced by living in an impure atmosphere, the blood becomes the medium by which the morbific matter is circulated through the system. To prove the effect of putrid emanations on the animal economy, Majendie confined a healthy dog in a situation which exposed him to putrid miasmata. For the first four days there was no change; he then began to emaciate, and died much extenuated within six. Majendie imputed the death of the animal to the effect of the miasmata he respired and took with his food. On opening the body, which was much emaciated, the mucous membrane of the bowels was found inflamed.

CHAPTER II.

Arrangement or Classification of Fevers—Phenomena observed in a Febrile Paroxysm.—Varieties of Continued Fever: 1. *Simple Fever;* 2. *Inflammatory Fever;* 3. *Gastric Fever.—Of Complicated Fever:* 1. *Cerebral Complication;* 2. *Pulmonary Complication;* 3. *Abdominal Complication.—Of Typhous Fever—Division into Typhus Mitior and Gravior—Symptoms of Typhus Mitior.—Of the Congestive Typhus of Armstrong.—Symptoms of Typhus Gravior;* 1. *with Cerebral Affection;* 2. *with Pulmonary Affection;* 3. *with Abdominal Affection.*

The types of fever which are met with in temperate countries have been arranged according to certain phenomena observed in each. In one form, the symptoms or series of phenomena constituting the febrile paroxysm observe a continued or uninterrupted course; in a second, they do not follow a continuous course, but become either suspended for a definite

period, or a considerable remission or abatement only takes place; in a third, the febrile symptoms are accompanied with a peculiar eruption, which, with certain symptoms, indicates a particular form of eruptive or exanthematous fever.

The following classification, founded on these distinctive characteristics, embraces every form of fever.

1. Continued.
   - *a.* A simple.
   - *b.* Complicated.
   - *c.* Typhus.

2. Periodic.
   - *a.* Intermittents.
   - *b.* Remittents.

3. Eruptive, or Exanthematous.
   - *a.* Variola.
   - *b.* Rubeola.
   - *c.* Scarlatina.

Other distinctive appellations have been given to fever, founded on circumstances connected with the locality in which it occurs, or on some difference observed in the symptoms. Hence the origin of the terms *camp*, *hospital*, *prison*, or *jail* fever; or of the nomenclature, *inflammatory*, *bilious*, *nervous*, *malignant* or *putrid*, *petechial*, *typhoid*, *yellow* fever, &c.

Before entering on the consideration of the varieties of fever, it will be proper to make a few observations on the phenomena which occur in a febrile paroxysm. The paroxysm consists of three stages,—the *cold*, the *hot*, and the *sweating*, which in general succeed each other in the order enumerated.

These terms have been given from the peculiar symptoms observed in each stage: thus in the *cold* stage, there is sensation of cold accompanied by shaking; the *hot* stage is indicated by increased heat; and the *sweating* stage, by the diaphoresis or perspiration which terminates the fit.

The successive stages which constitute a true paroxysm of fever are only observed in intermittent fever, in which there is a perfect intermission, or *apyrexia* between the fits. In continued, and in symptomatic fevers (inflammations), though there may be sensible abatement of the febrile symptoms at irregular periods, complete suspension of the disease for a definite time, as is observed in periodic fevers, never takes place. Though these diseases are often ushered in by a sensation of chilliness or actual shivering, almost invariably by morbid heat of skin, still the rigor or cold stage is so frequently unobserved, that it cannot be said to be essential either to the continued or symptomatic forms of fever.

The first symptoms of the *cold* stage denote a primary impression on the nervous system. This is evinced by the disincli-

nation to exertion, and the evident feebleness or actual prostration. To these succeeds more or less restless uneasiness, which induces the patient to endeavour to obtain relief by frequent change of posture. This restless state is generally accompanied with more or less mental inquietude; hence the inability to fix the mind on any subject requiring continued attention. These are the sensations precursory to the rigor or shivering-fit, the first indication of which is a feeling of chilliness: this may be general or only partial; for instance, it may be confined to one or more of the limbs, or to the loins, while the other parts of the body feel comfortably warm. The chilliness, after continuing some time, passes into tremor, which begins first in the lower jaw, and then gradually extending over the body, terminates in general muscular agitation. The tremor is often very severe; in some instances so violent, that according to practitioners who have witnessed the more intense forms of intermittent fever, convulsions have actually supervened; this, however, is to be regarded as a rare occurrence, at least in temperate climates. The skin feels cold, not only to the patient himself, but sensibly so to another person; and when the thermometer is applied, the temperature is found to be many degrees below the average standard of health: according to Dr. Wilson Philip, it has been observed as low as 74° Fahrenheit.

As the cold stage passes off, the skin becomes

gradually warmer, though the patient is not always sensible of the change; hence, while he still complains of feeling cold, the skin often feels comfortably warm, or even warmer than natural, to another person.

The appearance of the skin in the cold stage indicates a deficiency of animal heat; the lips, nails, fingers, and toes, in fact those parts at a distance from the centre of the circulation, are pale and shrunk, while the skin becomes rough, resembling that of a fowl after it has been stripped of its feathers: hence the term *cutis anserina* has been applied to express this condition of the skin. The shrinking of the integuments is exemplified by the fact of a ring which fits the finger before the approach of the cold stage, becoming so loose as to fall off soon after it commences. It is also not uncommon for ulcers to dry up, or tumours to diminish in size, and even to subside altogether, while the cold stage of fever lasts: but when the hot stage becomes developed, the finger enlarges, so that the ring again fits tight, ulcers again discharge pus, and tumours reappear.

From the intimate sympathy between the nervous and circulating systems, there is in the cold stage of fever some alteration in the pulse. At the very commencement of the fit, before the rigor has come on, it is more feeble than natural; during the shivering it is small, quick, and occasionally irregular. The breathing is generally at the same time hurried,

often suspirious, and the patient complains of tensive pain or constriction in the præcordial region.

When this unnatural state of the muscular, circulating, and respiratory systems has continued for some time, the mental functions not unfrequently become disturbed, indicated by the restlessness so common in almost every kind of fever, by some degree of confusion, and sometimes delirium, or even coma. In some instances the nervous influence of parts at a distance from the brain become impaired, as in the instance of some of the senses becoming affected, or of the patient complaining of a sensation of numbness in the extremities.

The organs of secretion are at the same time more or less deranged. The patient is indifferent to food, and complains of thirst and of a disagreeable clammy state of the mouth. In some instances there is gastric disorder, manifested by frequent retching or vomiting, or purging of bilious fluid. This gastric irritation is, however, seldom observed in the periodic fevers of temperate countries, though in the bilious remittents of hot climates it forms a prominent character of the disease, and is not unfrequently attended with jaundice. The urine in the cold stage is limpid.

The analysis of the symptoms of the cold stage of fever proves the consecutive disturbance of the nervous, circulating, and secreting systems. It is, however, to be remembered that there is great difference in the intensity

of the affection in the several organs; the prominent characteristic—the sense of cold, or even the rigor may be altogether wanting, or only represented by a degree of general indisposition, such as languor, chilliness, and sense of feebleness. This will be more particularly pointed out when irregular periodic fevers are noticed.

The duration of the cold stage of fever varies from half an hour to four or five hours, but there is every intermediate variety as to its length. It is often longer in the first than in the subsequent paroxysms, and shorter in remittents than in intermittents; so that, although its average duration may be computed between one and two hours, much depends on the type of the fever, its severity, and the climate in which it occurs. It is always longer and more severe in warm than in temperate countries; it may even be mitigated by the adoption of certain measures; but as a general rule, it has been observed that when the cold stage is short, the subsequent stages of the fever are almost invariably severe.

Though there is seldom any danger to be apprehended in the cold stage, it is proper to state, that under some circumstances, so great has been the shock given to the nervous system, that the vital powers have never recovered such a degree of energy as to produce reaction; indeed individuals have actually died in the cold fit.

The approach of the *hot* stage of fever is indicated by the chilliness or shivering sub-

siding, or alternating with warm flushings. The natural heat and colour of the skin then return, the shrinking and cutaneous constriction being succeeded by fulness, especially of the features, which in the beginning of the hot stage appear more turgid and animated than in health. This is followed by increased heat, which becomes gradually diffused over the body, the thermometer indicating an increase of several degrees above the ordinary average temperature of health, (varying from 100° to 105° Fahrenheit,) while the skin feels dry and parched. With these external changes, there are corresponding alterations in the functions of the several organs: for example, the depression, stupor, or coma of the cold stage is succeeded by sensibility to external impressions, so that sounds or brilliant light are offensive; there is generally pain in the head, back, and limbs, and not unfrequently transient delirium. The breathing becomes more free; the pulse, from being small, feeble, and rapid, becomes more full and expanded, and the sense of præcordial constriction, which is so oppressive in the cold stage, subsides. In this accelerated state of the circulation, hemorrhage from various parts, more particularly from the nose, lungs, uterus, or bowels, is not uncommon. These evacuations of blood have generally been remarked to be salutary, by relieving local congestions, which are apt to take place in the hot stage of fever.

There is little change in the natural functions: there is perhaps more thirst; the urine becomes high-coloured, but on standing does

not deposit any sediment; and should there have been much gastric disturbance during the cold stage, it generally abates or goes off entirely as the hot fit becomes developed.

The hot stage gradually terminates in copious perspiration. This constitutes the *sweating* stage, which is generally followed by great relief. The upper parts of the body first become bedewed with moisture, the sweating afterwards extending over the trunk and lower extremities. The sensorial disturbance now vanishes, the pulse resumes its natural tranquillity, the breathing becomes easy, and the urine in many instances deposits a sediment some time after it has been voided. The sweating, after continuing some time, disappears, but the patient remains weak and exhausted after the paroxysm has quite disappeared.

Though these three stages occur in regular progression in every well-marked paroxysm of periodic fever, there is great diversity in the intensity and duration of each paroxysm as well as of its several stages, as will be fully illustrated when the different forms of periodic fevers are treated of.

The class of fevers which have been grouped together under the term *continued* are so called from the paroxysms consisting of remissions and exacerbations, without intervals of abatement or pyrexia, as in the intermittent and remittent types.

In systems of nosology, every variety of continued fever is comprehended under the term *Synochus* (from the Greek word συνέχω,

to continue). The milder forms have been termed *synochus mitior;* the more intense, *synochus gravior;* the intensity depending on the various local inflammations which arise in the progress of the fever. We shall describe the first variety under the term *simple fever;* the second, under that of *complicated fever.*

Simple Fever.

There is, perhaps, no disease in which the premonitory symptoms are so diversified as those of fever; this is owing to the general resemblance observed in the commencement of every febrile disturbance, whether idiopathic or symptomatic; and it is not until the symptoms have continued for some time, that the practitioner can discriminate the precise nature of the disease.

In idiopathic fever there is generally a period of undefined indisposition, evinced by disinclination to mental exertion: the individual is incapacitated from any ordinary mental effort, his perceptions are less clear and distinct than usual. To this condition of the mental powers the term *languor* is applied, and it is always an indication of the commencement of febrile action. A sensation of *lassitude* or diminution of muscular vigour is next felt; the patient feels fatigued and averse to any kind of exertion; if he attempt to walk, his movements are feebly or unsteadily executed. The muscles soon become unable to support the weight of the body; hence the recumbent posture is not only most easy, but indispensable.

Boerhaave first applied the characteristic term *debilitas febrilis* to this state of the muscular system in fever. The alteration in the expression of the countenance, so marked in fever, is probably intimately associated with this condition of the muscular system, and forms a diagnostic of great value to the experienced practitioner, not only of the nature of the disease, but of the various changes which take place in its progress. It is difficult to give in words an idea of the febrile countenance: there is a look of anxiety, denoting much inward distress; the features are pale and sharp; and the whole expression is so changed as at once to alter the character of the countenance: hence the favourable impression which is always taken from any improvement in the aspect of the features.

Irregular chills and sometimes shivering come on; but more generally there are alternate fits of heat and cold of short duration, which continue to recur at intervals, even when the skin is hotter than natural; and it will be observed that during the time the patient complains of chilliness, the skin does not feel cold to another person, nor does the thermometer indicate any diminution of temperature. It appears, therefore, that the coldness is produced by some cause within the system itself, and is by no means to be attributed to external temperature, as it is observed in hot as well as in cold climates, and to recur when every precaution has been adopted with respect to the temperature of the apartment and the clothing of the patient.

About this period there is great restlessness, and uneasiness of an undefined and indescribable nature, which, after a short time, is succeeded by pain in the loins and extremities, with feeling of general soreness.

These symptoms, denoting the first stage of fever, are succeeded by those indicating reaction. The face becomes flushed, and the heat over the surface is steadily and uniformly above the natural temperature, varying from 100° to 105° Fahrenheit. The heat on some parts of the body is perceptibly greater than on others; hence, in those irregular accessions which take place, the increase is chiefly perceptible in the face, hands, and feet. Sometimes, on the other hand, there is no increase of the animal heat in fever; the skin throughout the course of the disease retaining its natural temperature, or in some cases falling even below it: such deviations are always to be regarded as unfavourable, though, as physiology has not yet discovered the source of animal heat, we are ignorant of the causes on which they depend.

If the circulation be now examined, the pulse, which at the beginning is oppressed, will be found quick, seldom, however, exceeding 100. Besides increased frequency, it may have acquired other characters; it may be quick and soft, or full and strong, seldom, however, hard or tense. It occasionally, though very rarely, happens that the pulse does not, during the progress of fever, vary from its natural condition either as to frequency or power, and even when the other symptoms

are well marked. A similar anomaly has just been pointed out as to the heat of skin, which now and then does not exceed, or even falls below the natural temperature.

Though the function of respiration is not necessarily involved in fever, still, when the febrile excitement is considerable, the breathing becomes hurried. This condition must be distinguished from that which depends on some inflammatory condition of the lungs. The absence of cough in the one instance, and its almost invariable presence in the other, with the sounds elicited by auscultation, will tend materially to aid the practitioner in forming a proper judgment of this symptom. It should also be kept in view that in those forms of fever in which the brain is severely affected, the breathing becomes embarrassed. It is sometimes short and quick, or slow and interrupted. In these cases the state of the breathing is the effect of the disturbance in the brain, and not of pulmonary disease.

When the fever has thus become developed, the primary disturbance of the brain is succeeded by symptoms which indicate increased action in the cerebral vessels. This is indicated by headach; the pain being in some instances confined to the forehead, sometimes to the occiput. It varies in intensity as well as duration, but is always increased on any movement of the body, or any circumstance which excites the circulation. In many instances of the mild forms of fever, however, the patient never experiences headach; he complains only

of giddiness or of a sense of heaviness or weight, particularly in the occiput. It is not easy to explain the cause of these differences in sensation, but it is important to bear in mind, that they all depend on one and the same condition of the brain, and require similar though perhaps modified treatment.

As the disease proceeds, the languor and lassitude of the first stage give place to sensorial disturbance, indicated by great restlessness and irritability, and sometimes slight delirium towards evening, which abates or totally disappears in the morning.

The various senses are more or less disturbed: the hearing is often morbidly acute, so that even slight sounds give uneasiness if not pain; sometimes it is dull and obtuse; the sense of smell is vitiated; the taste is so altered that common articles of diet are scarcely recognised, and there is generally great aversion or loathing of food; the mouth is clammy; the tongue covered with thin white fur; and there is more or less thirst.

The excretions are altered, both as to quantity and quality; the urine is high-coloured and turbid, or deposits a sediment on standing; and the evacuations from the bowels are generally of an unhealthy character.

The fever is now said to be fully formed, or, in popular language, to be at "its height." In the majority of cases, towards the evening, or in some instances at irregular intervals, there is an exacerbation, or general increase of the febrile excitement, which abates towards the

morning. The accession is indicated by greater restlessness, by the skin becoming more hot, the face more flushed, and by increased thirst and frequency of pulse. It is probably in consequence of the increased velocity of the circulation through all the organs, and consequently in the brain, during these exacerbations, that the patient is so much more restless and indisposed to sleep; and hence it is that, when there is disposition to congestion or inflammation in any organ, it is often developed at these periods.

With regard to the duration of simple fever, the symptoms may continue without any particular change for a few days; but its limitation depends on a variety of circumstances. It may last only one day, and this constitutes the common *ephemeral* fever, which terminates in twenty-four hours; a form to which women in childbed, from a variety of causes, are occasionally subject: or it may go on for an uncertain number of days, or even weeks, terminating, however, in the majority of instances, about the end of the second or beginning of the third week. It not unfrequently happens that its duration is materially diminished by some spontaneous evacuation, either by the skin or bowels, or perhaps by some accidental hemorrhage; or without such spontaneous efforts of the system, by moderate venesection, if the febrile excitement require the loss of blood, or in milder cases, by purging, confinement to bed, and the adoption of a mild farinaceous diet.

The ancients, who accurately observed the

phenomena and progress of fever, remarked that the symptoms shewed a tendency to abate at regular periods, which were called critical days. This crisis was observed to occur on the third, seventh, fourteenth, and twenty-first days from the commencement of the symptoms, or first invasion of the disease. If the symptoms passed over the first period, those who gave credence to this doctrine predicted, that the fever would go on to the second or beyond it; for example, if the symptoms did not abate on the seventh, that the fever would not terminate till the fourteenth day; if this day were exceeded, that it would run on to the twenty-first, and so on.

Modern physicians place very little confidence in this restricted duration of fever. The ancients, being afraid of interfering in any way with the efforts of nature to get rid of what they supposed hurtful to the system, considered every kind of treatment improper, and were, therefore, more likely to observe, in the milder forms of fever, an abatement by crisis on particular days. The modern treatment of the disease, founded on more just views of its pathology or nature, is very likely to interrupt or disturb such regular periods of decline; and, therefore, though the doctrine of critical days is not in our day altogether exploded, practitioners are either less inclined to look for them, or to reject the idea as not according with nature. Besides, in fever complicated with local inflammation, such regularity in the crisis cannot be expected to occur; the

symptoms, depending in some measure on the condition of the organ, which may, in the progress of the disease, have become inflamed. It cannot, however, be doubted that the notion of critical days was originally founded on correct observation, that fevers are disposed to terminate favourably or unfavourably at certain periods; and though such critical termination cannot in every, or even in the majority of instances, be discerned or traced, the fact, that simple or uncomplicated cases occasionally do so, should always be kept in view.

The convalescence, or period of the decline of fever is observed to be gradual; the feelings of the patient improve, his countenance becomes animated, and its expression so altered, that except by those who are acquainted with the previous aspect of the countenance, the individual would not be recognised—the sleep becomes longer and more refreshing—the pulse comes down gradually till it returns to its natural frequency—the skin becomes cool—the tongue clean—the appetite for food returns—the thirst ceases, and the strength and spirits improve. These favourable changes indicate the stage of convalescence, which is confirmed in a few days under proper management, especially if great attention be paid to the regulation of diet, and avoiding undue bodily or mental fatigue. No consideration should induce the practitioner to relax in his close attendance during this most important, but too often neglected period of the disease.

The description now given applies to the

mild epidemic fever of this and other temperate climates. It is almost unnecessary to state, that there is every gradation not only in the intensity, but in the duration of the symptoms. The symptoms may be so mild as scarcely to require more than an aperient, quietude, and abstinence; or they may assume a severe character,—the fever passing into some of the other forms to be afterwards described.

Inflammatory fever.—A variety of continued fever of a hyper-acute form is occasionally observed, and though not very common in temperate climates, it does now and then occur, and requires notice. It has been called inflammatory fever (synocha), and may occur at all ages and in all habits, forming the general character of fever in young and plethoric subjects, who have great muscular power and corresponding vigorous circulation. When it occurs in cold and temperate countries, it is distinguished from simple fever (synochus) by its more sudden invasion,—by the more pungent heat of the skin, flushing of the face, suffusion of the eyes and intolerance of light—more intense headach, throbbing of the carotid and temporal arteries, watchfulness, and delirium. The pulse is seldom very rapid at first, but as the disease proceeds, it becomes full, round, and tense, but never remarkably frequent, and the blood after venesection generally exhibits the buffy coat. The breathing is quick, the thirst incessant, and the febrile restlessness distressing. In some instances, there is nausea and vomiting, with pain in the epigastrium, stretching

to either hypochondrium; more especially if this form occur in the summer and autumn months in warm climates, where it is generally termed bilious or bilious inflammatory fever. When inflammatory fever becomes fully developed, spontaneous hemorrhage not unfrequently occurs; if it proceed from the nose, it generally affords great relief to the symptoms, on which account it should not be interfered with, unless it produces feelings of exhaustion.

From the violence of the general excitement in inflammatory fever, local inflammations are exceedingly apt to supervene. It may also pass into other forms: we accordingly find that in warm climates, more especially in the West Indies and some districts of the United States, it assumes very often the remittent type, or it may lapse into a low kind of typhoid fever.

Its duration varies according to circumstances. It now and then assumes an ephemeral character,—disappearing in twenty-four hours: mild cases of longer duration by proper management may pass off in a few days; but if the symptoms be neglected in the commencement, the fever may last two or three weeks or longer, and then gradually subside, the symptoms losing their acute character as the disease advances.

It is proper, however, to state that in our experience of the epidemic fever of this country, this form, (synocha,) if it really do occur, has been seldom observed. A few sporadic cases, which have many of the essential characters detailed, certainly present themselves occasion-

ally in the spring months; but these form a comparatively small average proportion of the ordinary fever of Britain. It is, therefore, to the fevers which occur in warm climates that the description given more particularly applies; the character of fever, as will be afterwards explained, being materially influenced by climate and season. It is also necessary to bear in mind the local inflammations which almost invariably arise in the course of these acute fevers, and the effect of such complications on the febrile symptoms.

Gastric fever.—When the symptoms of common fever are attended with more than ordinary gastric derangement, the term *gastric fever* has been applied. Hippocrates, with his characteristic discernment, evidently alludes to this variety of fever, in treating of *acute diseases with heat and biliary dejections;* and Galen, the first writer who distinguished fevers into sanguineous and bilious, founded his idea of the latter from the condition of the stools. This form of fever has in later times been called by different names. Baillou first termed it *gastric* fever; Hoffmann, the *choleric;* Baglivi, the *mesenteric;* John Peter Frank, *febris continua gastrica;* Pinel, the *meningo-gastric.*

Disorder in the alimentary canal gives rise, not unfrequently, to fever of a particular form. In other instances, symptoms of gastric disorder may supervene on common fever: in either case, the train of symptoms, which are very much alike, and require a similar mode of

treatment, are, in the one case the cause, in the other, an accidental accompaniment of the fever.

Gastric fever may occur sporadically; at other times the gastric symptoms form the prominent type of an epidemic; and from its prevailing in the summer and autumn months after very hot weather, it would seem to be produced by some atmospheric or terrestrial emanations peculiar to this season of the year. There are several accounts on record of epidemic gastric fever: indeed, the fevers of Britain towards the end of summer and in the autumn, are almost uniformly accompanied with gastric irritation, and from our individual experience of the character of fever for the two preceding years (1830 and 1831,) we can affirm, that an unusual degree of gastric disorder has accompanied the disease during the whole of that period. The type of the fever has moreover been low and typhoid to a degree which has not been witnessed for many years preceding, so much so as to preclude the employment of evacuations of any kind, and to render stimuli necessary to an extent very unusual in the London Fever Hospital.

From a communication with which we were lately favoured by our friend Dr. Brown of Sunderland, it appears that a similar type of fever preceded the late visitation of cholera in the north of England. This fact, with the similarity of the symptoms of epidemic fever in those situations in which cholera has

hitherto appeared, renders it probable that some peculiar condition of the atmosphere has given a tendency to gastric disorder, not only in fever but in other acute diseases. It is a singular circumstance, also, that when cholera appeared in London, epidemic fever sensibly diminished both in frequency and severity, while the gastric irritation and prostration of strength, which formed the prominent features of fever, have also nearly subsided.

In gastric fever there is great variety in the mode of attack and sufferings of the patient. In some cases there is so little evidence of illness that the patient follows his ordinary pursuits, thinking he is only indisposed from derangement of stomach, till the prostration of strength and the gradual accession of febrile symptoms, shew evidently the nature of the disease. In other cases the symptoms from the beginning are so well marked, as to leave little doubt of their nature and tendency.

The precursory symptoms are very similar to those of other forms of fever—sense of chilliness, rigors, irregular flushes of heat, languor, lassitude, pain in the head, loins, and extremities. The face is pale and sallow, the conjunctiva yellow; the mouth clammy and bitter, the breath fetid; the tongue at first is slightly coated with thin white or grey fur, which increases in thickness, becoming yellow over the body and root, while the point and edges are red: in other cases, it is clean and morbidly red from the beginning.

More or less disturbance of the stomach is observed early in the disease; there is pain or sense of weight or distension in the epigastrium; often nausea and retching, which generally ends in vomiting of bilious fluid: the state of bowels is variable; there is either constipation alternating with diarrhœa, or there is purging from the commencement, the stools being watery, of a pale green or brownish yellow colour, extremely fetid, and occasionally mixed with blood. The pulse, which from the commencement may not have been much accelerated, now becomes rapid; the breathing hurried; the heat of skin pungent; the febrile uneasiness and general pain increased; and towards evening, there is exacerbation of the symptoms, with watchfulness and delirium. As the morning advances, however, a distinct remission takes place, accompanied with gentle moisture on the forehead and chest. The coating on the tongue becomes more thick, sometimes dry and brown; and the urine, scanty and passed with pain, deposits a lateritious sediment.

At a still more advanced period of the disease, we observe the morning remissions so slight as to be scarcely noticed, while the whole complexion of the symptoms becomes aggravated; the delirium, which was perhaps only noticed towards evening, is constant; the tongue, palate, and throat are more dry, and covered with viscid mucus, or a dry, hard, black crust envelopes the tongue, which is sometimes irregularly fissured and covered with aphthæ;

the speech and sense of hearing are impaired; the eyes suffused; the pulse is very rapid and compressible; the evacuations are passed unconsciously, with tympanitic distension of the abdomen. This congregation of symptoms denotes an intense and advanced form of gastric fever, from which the patient not unusually perishes, though if the previous powers have been vigorous, and the treatment judicious, the patient may be recovered. When a favourable termination is about to take place, the delirium abates, the morning remissions become again distinct and of longer duration, the skin cool and soft, the tongue and palate moist, the former throwing off its dark incrustation and exhibiting the subjacent mucous membrane morbidly red and tender; the bowels become pungent, the stools more consistent, and the abdomen feels soft from the subsidence of the tympanitic distension.

When a fatal termination is about to ensue, the yellowness of the eyes, headach, delirium, and flushing increase; the patient, at one time furious, becomes drowsy and comatose; the stools, and occasionally the urine, bloody and passed involuntarily; the tongue, tremulous, and, as well as the teeth, covered with dry black fur, cannot be protruded. To these symptoms succeed picking of the bed-clothes, starting of the tendons, hiccup, rapid breathing, cadaverous smell of the perspiration and breath, cold sweats, imperceptible pulse, and coldness of the extremities.

It is necessary to state that in gastric, as

well as other forms of fever, local inflammations arise in its progress. It is, therefore, important to watch the symptoms in the different organs, more particularly the brain, which from the inflammatory type of the fever at the commencement is often severely affected. In like manner the several organs in the chest and abdomen may become inflamed, and render the disease formidable. Frank states that in some cases, quantities of worms are expelled from the stomach and bowels during gastric fever. In such instances the febrile symptoms are accompanied with those peculiar to vermination—wandering pains, itching of the nose and anus, prominence of the abdomen, vomiting, tenesmus and copious mucous stools.

The duration of gastric fever is uncertain. When the disease is mild, it may not last above a week or ten days; generally, however, it is tedious and protracted, more especially if neglected in the early stage. It is unnecessary to state that its duration will be materially affected by any inflammatory complication with which it may happen to be associated.

Dr. Cheyne's description of epidemic gastric fever, in the Cyclopædia of Practical Medicine, gives an admirable sketch of this variety of fever; and we beg particularly to call attention to the observations of that able physician on this subject.

Complicated Fever.

In the preceding observations it has been

our object to shew that in *simple* fever the disturbance in the various organs, however severe, is only functional, no inflammation in any organ having as yet taken place.

It is necessary, however, that the practitioner should bear in mind, that although fever at its commencement may be mild, in a large proportion of cases it assumes a severe character, in consequence of some local inflammation arising in its progress. Hence, whatever be the primary effect of the exciting causes on the various organs, the transition from excitement to inflammation is often rapid, more especially when there is predisposition to disease in any particular organ.

From what has been previously advanced, as well as from the facts which will be adduced when the causes of fever are discussed, there are strong grounds for supposing that the febrile poison produces a peculiar or specific effect on certain organs of the body in the first instance. The affection thus primarily induced, whatever it may be, is not, however, of an inflammatory character, though it is evident, both from symptoms observed during life, and from morbid appearances after death, that inflammation does arise in certain organs in the progress of fever. If the febrile poison be not in a state of great concentration, it may be presumed that a peculiar action only is exerted on one or more organs; if the poison be in a state of greater activity, it would appear to produce severe organic lesion—inflammation, and its consequences.

We do not pretend to explain the modus operandi, or theory of action of the causes alluded to; or why, in individuals exposed to the same causes, in one case very slight effects, while in another the most severe and often fatal symptoms are produced. There may be greater aptitude for the reception of the febrile poison in one person than in another, arising from individual peculiarity or idiosyncracy, as it has been termed.

This tendency of the primary febrile affection to pass into inflammation, which local inflammation is the cause of the severity in the majority of cases of fever, should never be overlooked. It is equally important to bear in mind that the inflammatory action which supervenes, is of a less intense kind than in the ordinary phlegmasiæ.

There are few organs in the body which are not occasionally affected in fever. Some, however, suffer more uniform and severe lesion than others; as for instance, the brain and spinal marrow, the mucous membrane of the lungs, and of the alimentary canal. Inflammation of the parenchyma of organs is occasionally, though less frequently, observed.

Cerebral complication.—From the almost invariable disturbance in the brain and nervous system in fever, it is particularly necessary to watch any tendency to transition from functional disorder to inflammation of the brain. Not only the symptoms during life, but the morbid appearances discovered after death prove that inflammation of the membranes of the brain is

by far the most frequent and dangerous of the local inflammations that occur in the progress of fever.

The cerebral affection assumes various degrees of intensity. In some cases it is mild, in others severe; and between these extremes there is every intermediate modification. Sometimes the cerebral affection appears in solitary instances during a mild epidemic, or it may form the prominent character of epidemic fever.

If the symptoms be attended to, it is impossible to overlook the first indications of acute affection of the brain in fever. The general symptoms may at first be little urgent, and proceed as has been stated in the history of mild fever. The patient, however, is afterwards observed to complain of more constant and severe pain in the head, accompanied with throbbing of the carotid and temporal arteries, flushing of the face, and heat of the scalp. In general the pain is confined to a particular part, very often to the forehead and temples, occasionally shooting to the occiput: at other times it is felt chiefly in the back of the head.

In many instances the cerebral inflammation is not indicated by pain, but by giddiness. Even if the head be shaken, or suddenly moved, no pain is induced, though the giddiness and flushing are increased. Moreover, when pain in the head has existed, it is often of short duration; but, notwithstanding it has ceased, the local affection may be proceeding with equal, if not increased vigour, and, if not arrested, may speedily destroy life. The

absence of pain in such cases, therefore, must not be allowed to throw the practitioner off his guard; he must be guided in his opinion of the condition of the brain by the presence of other equally pathognomonic signs. Thus the eyes are brilliant or suffused, their expression either morbidly animated or dull, but generally sensible to light; hence the contracted eyebrows, half-closed eyelids, and the relief experienced from a dark room.

The sense of hearing is also morbidly acute. Sounds which the patient has been accustomed to hear without even exciting attention, become disagreeable, or even painful; every precaution in such cases is therefore taken to lessen their intensity.

Though the febrile action usually produces a state of watchfulness, this condition is much increased when the brain becomes inflamed; it is often accompanied with a degree of restlessness or moaning; but after the cerebral vessels have been unloaded, the patient generally becomes tranquil, and enjoys intervals of refreshing sleep.

There is also in cerebral inflammation more or less intellectual disorder. In milder cases, the patient is perfectly conscious while awake, but if he drop asleep, it is interrupted by talking; and when he awakes, he is for a time forgetful, utters perhaps a few incoherent sentences, and then becomes perfectly sensible. As the evening approaches, however, the confusion becomes again perceptible, especially on the termination of the occasional short

periods of disturbed sleep which attend this stage of the disease. In more severe cases, delirium is observed at intervals during the day when the patient is awake; and if the symptoms in the brain be urgent, it is incessant, loud, and noisy.

The symptoms enumerated indicate a degree of inflammation of the brain, not uncommon in the epidemic fever of this country, which, if treated by the early and vigorous employment of suitable measures, is in general readily subdued, and the recovery proceeds satisfactorily.

The cerebral affection, however, occasionally assumes a more severe form; and those destructive changes which often rapidly take place in the delicate organization of the brain, sufficiently shew the intensity of the previous inflammatory action. The symptoms which indicate this more severe form of brain affection differ from those which attend the sub-acute, chiefly in degree. The pain is more severe and constant; the patient often rolls the head from side to side; the eyes are more suffused; the sensibility to light and sound is greater; the breathing is rapid and suspirious; the anxiety of countenance is increased; the restlessness and delirium assume a more formidable character: while the noisy vociferation or screaming is incessant, the violence of the patient often requiring restraint. The pulse is more round and tense, but in some cases it is soft, irregular, or intermitting. The skin is hot, and often perspires profusely, in conse-

quence of the incessant bodily agitation or struggling. If active treatment be neglected in the beginning, or should the attack in the brain be of such a severe character as to bid defiance to the treatment employed, the powers of the system give way, the delirium does not subside, but it loses by degrees its acute character; the patient becomes drowsy, and observant only when roused; the eyelids are half closed; sometimes there is squinting or rolling of the eyeball, with dilatation of the pupils; muscular tremor and starting of the tendons come on; deglutition is performed with difficulty; and the drowsiness finally passes into profound coma. The patient then becomes insensible to all external objects; the urine and stools are passed involuntarily; the tongue becomes dry and brown; the teeth and lips covered with sordes; the pulse rapid and feeble, occasionally irregular; and life is speedily destroyed.

It is necessary to bear in mind that between acute and subacute inflammation of the brain in fever, there is every variety of degree or intensity. In many instances the cerebral inflammation assumes a slow insidious character, and is only detected by vigilant examination. Sometimes when there is considerable excitement in the brain, the pulse and other febrile symptoms do not indicate much febrile action; the pulse may not be above the average frequency of health. In some cases the pain ceases entirely, and is succeeded by partial insensibility. The skin may be cool, and the tongue little furred; yet

notwithstanding these favourable circumstances, a low form of chronic cerebral inflammation may be going on.

In some instances, again, inflammation of the brain suddenly comes on in the progress of the fever, when there were no previous warnings of its approach. Hence the necessity of watching with incessant vigilance every case of fever during its progress; as no case, however mild or promising, is free from the possibility of sudden attacks of inflammation of the brain.

Pulmonary complication.—The organs of respiration at certain seasons, and in particular epidemics, suffer from inflammation in the course of fever. Laennec states on this subject, that "one of the most interesting results which auscultation has furnished is the constant presence of a catarrhal affection, either latent or manifest during the whole course of continued fever. At the commencement, and most commonly through the whole period of the fever, the catarrh is latent, without cough and expectoration, and only to be discovered by the stethoscope. Sometimes it becomes manifest on the approach of a crisis; and, indeed, the crisis by expectoration noticed by the ancients is neither more nor less than this catarrh. Catarrhal fever is applied to those forms in which the catarrh, just stated to be inseparable from continued fevers, early manifests itself, and gives rise to a copious mucous expectoration. The same appellation has also been given to those violent catarrhs which are ac-

companied by a symptomatic fever; but in this case the fever, though considerable at first, and often of long continuance, soon loses the character of acute fevers, terminates long before the catarrhal affection, and never presents that combination of cerebral congestions and abdominal disorder, more or less severe, exhibited by true idiophatic fevers, which must be considered as diseases affecting at the same time a great many organs, and perhaps still more particularly the fluids. In eruptive fevers the pulmonary catarrh is equally constant, and most commonly in them it is manifest. In measles it is well known always to be so, and it continues often for a long time after this disorder is cured. The same thing occasionally takes place after simple continued fevers; but in these I have also had frequent occasion to observe, that when a crisis takes place, at the very time when the lateritious sediment shews itself in the urine, every sign (even stethoscopic) of perhaps a very intense and extended catarrh disappears at once with the coma, tympanitic affection, quick pulse, heat, and earthy character of the skin. During the paroxysms of intermittent fever the stethoscope detects in like manner symptoms of catarrh, for the most part dry and latent, and of which some traces remain in the intervals. Even the fevers which are most decidedly symptomatic, for instance those arising from a wound, very commonly present the same phenomena. It would, therefore, seem that the first effect of febrile action is to produce a congestion in the mucous

membrane of the bronchi; and this effect is readily conceived on taking into consideration the energy of the actions of concentration and expansion which constitute fever. The inflammatory fever of nosologists, that is, the fever characterised by a flushed countenance, moist and clean tongue, and a moist and moderately hot skin, is, of all fevers, that in which the marks of dry catarrh are the least perceptible. I have even observed two cases of this fever in which the sound of respiration through their whole course was uniformly strong and *pure*, that is, unmixed with any kind of rattle over the whole extent of the lungs. It may here be remarked that this species of fever is, of all, the least liable to change into another form; that it is rarely accompanied by symptoms of any considerable degree of cerebral congestion; that it is hardly ever attended by signs of irritation, or by eruptions or ulcerations of the mucous membrane of the intestines, or by a tympanitic state of the same; and, lastly, that it is almost the only fever in which the blood exhibits the inflammatory crust. In all these respects, then, the inflammatory fever appears to differ either in its nature or cause from other continued fevers; it is unquestionably the most simple of all, and can least of all be considered as a primary affection of the solids. Pulmonary catarrh is occasionally a striking symptom of pernicious intermittent fever. This appears to have been the case in the epidemic catarrhal fever of 1778; for we find a French Medical Society about that time giving it as a

prize question, '*To ascertain the relations of remittent catarrhal and pernicious fevers.*'" (Laennec, p. 101–2.)

Although bronchitis is a very frequent complication of fever, especially in some epidemics, and at particular seasons, it is by no means so universal as the observations of Laennec would lead us to suppose: neither is it to be considered an essential constituent of either continued or remittent fevers; but that it does occasionally supervene in both forms is undoubtedly true. It is perhaps, of all the complications, the most universal in the fever which occurs in the winter and spring months in this country; and no doubt its frequency is in a great measure to be imputed to the sudden variations of temperature peculiar to the climate of Britain.

The symptomatic bronchitis of fever is scarcely to be recognised during the first few days. When it becomes more developed, the symptoms are, besides those which are proper to fever, pain or constriction in the chest, slight acceleration in the breathing, with wheezing sound (mucous rattle) of the respiration on applying the ear or stethoscope to the chest. There is generally at the same time cough, which comes on in fits; it is dry in the early stage, but in the course of a day or two expectoration of viscid mucus, which is expelled with difficulty, and occasionally streaked with blood, takes place. As the bronchitis proceeds, the expectoration becomes more copious and easy, and of a pale yellow or greenish colour. The mucous rattle may be partial or

extensive, according as the bronchitis is confined to a small or large portion of the lung. When it is heard over the whole of one lung, the bronchial affection is severe; if it be distinct in both lungs, the case generally terminates fatally. In some cases, however, there is no cough, the existence of the bronchial affection being indicated by slight acceleration in the breathing, with sense of constriction in the chest. The absence of cough renders the local disease very apt to be overlooked; but the state of the respiration, with the aid of stethoscopic examination, will generally sufficiently point out its existence.

In many instances, especially in persons who have had former attacks of pulmonary catarrh, the bronchial affection assumes a more intense form. The breathing is hurried and oppressed, especially after fits of coughing; sometimes it is slow, laborious, and wheezing; the lips are of a dark blue, or livid colour; the cheeks flushed, or of a dusky hue. In still more intense cases, the whole countenance becomes suffused with dark-coloured blood, and from the air-cells being clogged with viscid mucus, the blood is not duly arterialised; the functions of the brain are, consequently, more or less embarrassed, according to the severity of the bronchial affection. The patient first becomes occasionally incoherent, and afterwards comatose; the pulse soft and feeble; the tongue covered with deep brown, or almost black crust, while the temperature of the skin, more

especially of the parts at a distance from the centre of the circulation, falls below the natural standard. It is unnecessary to add that these symptoms indicate great danger; for although recovery under such circumstances may take place, the majority die, the fatal issue being accelerated by the destructive effect of unoxygenated blood on the brain and nervous system.

It should be kept in mind, that in cases of fever accompanied with severe affection of the brain, the various local complications become so much obscured as to be in many instances entirely overlooked. It has been already remarked that symptomatic bronchitis is often latent in the early stage. When the affection of the brain has been urgent, the bronchial affection never becomes so fully developed as to be recognised by its usual symptoms; it may be going on in an intense form, without any suspicion of its existence. The advantages to be derived from auscultation under such circumstances must be evident; and, therefore, in all the severe forms of fever, the application of the stethoscope should never be omitted.

Though bronchial inflammation is the only form of disease in the chest which can be said to be peculiar to the severe forms of fever, yet true pneumonia and even pleurisy may arise in the progress of the fever, more especially during the stage of convalescence in cold, variable weather, and often under such circumstances prove fatal.

In some instances these inflammations, also, assume a slow insidious character, or become

entirely latent; and so obscure do such complications become, that extensive organic changes have been discovered after death, the signs of which have been either very doubtful or entirely wanting during life. Such cases are more common when the previous affection of the brain has been severe; and hence the necessity of frequent stethoscopic examinations in the course of fever, especially if protracted.

It is here necessary to advert to a particular form of fever, which has at various times appeared epidemically in different parts of the globe. From the catarrhal symptoms which gave the peculiar character to the disease, it was termed *catarrhal fever*, *epidemic catarrh*, or *influenza*. The disease appears to have been the consequence of an atmospheric poison acting on the mucous membrane of the air passages; and from the extent to which it prevailed, and other circumstances observed in those who were seized with the disorder, to have had strictly and truly an epidemic origin. It spread over large territories, travelling from north to south, though less frequently, from east to west. The epidemic of 1781–2 is recorded to have first made its appearance in China, and to have traversed Asia into Europe; from thence it crossed the Atlantic, and extended the following year over the continent of America.

The symptoms usually commenced with alternate fits of chilliness and heat; sometimes shivering preceded the febrile indisposition. The

patient soon after felt great languor and feebleness; the debility and depression of spirits being always to a greater degree than could have been anticipated from the mildness of the other symptoms. The most striking feature of the disease next appeared—a distressing pain and sense of constriction in the forehead and temples, often extending over the whole face, and accompanied with a sense of soreness in the cheek-bones. These symptoms were followed by uneasy sensation about the eyes, sneezing and hoarseness, incessant cough, with soreness and constriction about the præcordia, or stitches in the chest, and pain in the back and loins. To these succeeded lachrymation and profuse discharge of thin mucus from the nostrils and lungs, which continued through the course of the disease.

The appetite and sense of taste were much impaired or entirely lost; in many cases there was nausea, and sometimes vomiting; the tongue being coated with thin mucus. The thirst was inconsiderable; the state of the bowels variable; in some they were regular, and in others confined; sometimes there was spontaneous diarrhœa, generally attended with pain, at various periods of the disease.

The pulse, though frequent, was soft and easily compressed; the heat of skin was relieved by irregular sweatings. Daily exacerbations and remissions of the cough and fever were in many instances observed; in others, they did not occur, or if they did, were so slight as to escape observation.

The disease was in some cases very mild; sometimes there was only slight fever, with soreness of the throat and uneasiness in the chest, but no discharge of mucus; but the languor and lassitude were always well marked. In some the disorder began like smart fever, and in a day or two assumed the characters of common cold, and continued to hang about the patient for a period varying from a week to a month.

Abdominal complication.—Of the organs situated in the cavity of the abdomen, the mucous membrane, but more especially the follicles of the small intestines, undergo certain changes, and although these intestinal lesions are by no means invariable, yet, as we have before stated, in some epidemics, and in the fever of particular localities, they are frequently observed, and form severe and often dangerous complications.

In milder cases of the common fever of this country there is probably little if any intestinal affection; but in the more severe forms the intestinal disease becomes a prominent characteristic of the fever, and generally induces sympathetic disturbance of the brain, or should the cerebral affection have already existed, never fails to increase it. In gastric fever the abdominal symptoms are often so obscure and insidious as scarcely to attract serious attention till the disease has made some progress. Indeed, in fever, destructive disorganization of the bowels may be going on without the practitioner being at all aware of its existence,

from the want of diagnostic symptoms to indicate the intestinal lesion on which the danger depends. It is often the cause of slow and protracted fever, and a febrile indisposition which is mild at the beginning often becomes serious from the supervention of this secondary intestinal affection. It may be suspected in such cases, when, in addition to the ordinary febrile symptoms, the skin is dry and parched, the thirst excessive, the lips and prolabium red, the tongue red at the point and margin, the bowels irregular (diarrhœa alternating with constipation), and the abdomen tympanitic, with or without tenderness.

When the brain becomes sympathetically disturbed, the face is flushed, delirium supervenes, followed by more or less stupor or coma, and insensibility to pain and to the evacuations by urine and stool.

Dr. Bright, who has given an excellent account of the symptoms and morbid anatomy of this intestinal affection as it occurs in the course of continued fever,* considers diarrhœa to be the first symptom by which it is indicated. This sometimes exists from the beginning, but more commonly does not come on for nearly a week; the stools are frequent, five, six, or eight in the course of twenty-four hours, and, at first, feculent, dark, and fetid; but afterwards thin and watery, and as if ochre had been mixed with them. The ochre diarrhœa Dr. Bright considers to be character-

* Report of Medical Cases.

istic of the commencement of intestinal ulceration, the increasing or decreasing frequency, quantity, and consistence of the evacuations indicating the progress of the intestinal disease. There may or may not be abdominal tenderness or tormina, but when there is pain of the abdomen on pressure, he considers it indicative of inflammation having extended to the peritoneum. Dr. Bright corroborates the opinion already given as to the subsequent sympathetic disturbance of the brain arising from the condition of the intestines, but admits that the cerebral affection may precede and be entirely independent of the intestinal disease, though it progressively increases or diminishes according to the progress of the ulceration of the bowels.

We have already alluded to the opinion entertained by many French pathologists that the follicular disease which was first described by M. Petit is the primary cause of fever. Cruveilhier states that, after he and his fellow-students had watched at the Hôtel Dieu the progress of severe fevers (les fièvres graves), and the seat and character of the lesions after death, they became tired of the vague denomination of inflammatory, bilious, mucous, adynamic, and ataxic fevers, finding the same anatomical characters were always discovered in the intestines; they therefore proposed to substitute the term *intestinal fevers*, for the more vague phraseology which had been introduced. He asserts that this follicular disease occurs under three forms: 1. the acute or inflammatory form; 2. that ac-

companied with prostration and stupor *(adynamic form)*; 3. that attended with cerebral excitement and delirium *(ataxic form)*. Inflammatory complications may arise and give a particular character to the disease, but still the original primitive follicular disease exists, and constitutes the most characteristic feature of the malady, which is seated always in the extremity of the small intestines. The ileo-cæcal valve is the principal seat of the lesion; it extends thence as from a centre, gradually diminishing from the last twelve inches to two or three feet in the ileum.

The follicles of the cæcum, appendix cæci, and ascending colon, are also occasionally affected. The mesenteric glands corresponding to the diseased portion of intestine are inflamed and enlarged: hence the name *entero-mesenteric* fever given to this disease, of the symtoms of which Petit has given the following summary:—Feeling of debility and general indisposition; loss of appetite; lassitude; and irregular attacks of fever; the countenance expressive of prostration; the skin, especially about the lips and alæ nasi, often harsh and dry; disinclination to exertion; great torpor and intellectual dulness. The febrile symptoms are obscure during the day; but there is an exacerbation towards night, without shivering or much heat of skin; the eyes, before languid, become injected; there is slight delirium; the thirst is urgent; the teeth are dry; the tongue is coated with grey fur; the stools, which vary in frequency and abundance, are bilious, or serous, and

insufficient to account for the prostration; the abdomen is soft, and not distended; there is little if any tenderness, but pressure applied to the right side, between the umbilicus and crest of the ileum, often causes pain. As the symptoms increase, the cheeks become livid; the eyes sunk and suffused; with constant somnolence and delirium, though the patient when roused gives intelligent answers. Petechiæ, subsultus, and tremors supervene; the pulse becomes rapid and compressible; the teeth covered with sordes, and the tongue with brown or black crust. Abdominal tenderness now succeeds, the pain being in some cases still confined to the ileac region, and without tympanitis; in other cases more diffused, and accompanied with distention. The stools are frequent, serous, and offensive, and the urine is scanty. Excoriations succeeded by sloughing of the nates, and tendency to gangrene on those situations to which blisters have been applied, protract the sufferings of the patient, unless, as generally happens, death puts an end to complicated misery. It is asserted by the French pathologists that it is the most common form of fever in France, and that it may occur sporadically, or constitute the principal feature of epidemic fever.

The successive changes which take place in the mucous follicles during the progress of fever will be explained in the morbid anatomy. It will then be shewn that the destructive processes of ulceration go on progressively, until

the coats of the intestines are destroyed in succession, and intestinal perforation at length takes place. The symptoms which denote that this lesion has occurred are, sudden intense pain, with rapid distention of the abdomen, small quick wiry pulse, and peculiar alteration in the countenance. Intestinal perforation is always fatal, generally within thirty-six hours.

Though *peritonitis* cannot strictly be said to form one of the complications of fever, it occasionally supervenes, more particularly at the period of convalescence. Peritoneal inflammation is readily distinguished by the acute pain in the abdomen, increased on pressure; by the knees being drawn up towards the belly; by the sickness or vomiting, and the small wiry incompressible pulse. In some cases, however, there is neither sickness, vomiting, nor frequency of pulse; but only tenderness of the abdomen on pressure. Whether, therefore, this symptom (abdominal tenderness) be accompanied with other distinguishing signs of the disease or not, it should never be overlooked, but treated with decision, as abdominal inflammation may be going on, and even proceeding to a fatal termination, with a quiet pulse and soft skin.

In the preceding account of the complications which occasionally arise in the progress of fever, we have confined the description to cases in which the lesion has arisen either in the brain, in the chest, or in the abdomen.

It happens, however, that in some instances complications take place in more than one organ at the same time. Thus there may be cerebral affection from the commencement of the fever, and in its progress pulmonary or abdominal symptoms may arise; or there may be primary gastric symptoms, with which the brain sooner or later sympathizes. In still more severe cases, inflammatory symptoms in the brain, chest, and abdomen may exist at the same time. It is seldom, however, that in such instances the organs suffer equally, there being generally one on which the inflammatory action has seized with greater intensity.

It is important to remember what has been already stated, that in those more severe cases in which the cerebral affection predominates, should inflammation in some other organ subsequently arise, the symptoms are more or less masked by the cerebral disease. Hence arises the obscurity of the symptoms in those cases of latent pulmonary disease with which fever is frequently complicated, the symptoms being in a great measure concealed by the condition of the nervous system.

In like manner, should peritonitis supervene, the pain may be so slight as not to be felt even on pressing the abdomen; if, however, this condition of the brain subside, the tenderness of the belly becomes developed, so that the practitioner is very apt, if not aware of the cause of the sudden sensation of pain,

but though these forms bear a strong analogy to typhus, we think they only form an intermediate class between the more acute and typhoid types. Though the majority of French writers have retained typhous fever in their arrangement as a distinct class, others, more especially Louis and Cruveilhier, as we formerly stated, ascribe the whole symptoms to primary affection of the mucous follicles of the intestines.

To this, however, we by no means assent, as we have traced the progress of typhous fever, both in the London Fever Hospital and in private practice, to its fatal termination, and on the most minute examination have been unable to discover the follicular disease which these authors state to be so invariably its cause; while on the other hand, we have met with follicular ulceration in individuals the symptoms of whose previous disease had no resemblance to those of typhous fever.

The typhoid form of fever is observed in some individuals during an epidemic of a very different type. When such sporadic cases occur, they probably arise from some peculiarity in the individual, or in the circumstances in which he may be placed. It is not uncommon to find fever, which at first is very mild, assume by degrees the typhoid character. If an individual, seized with fever, reside in an unhealthy district, or be confined in a small crowded apartment, where no attention is paid to ventilation and cleanliness, the probability is that a disease, comparatively mild at first, will be converted into one of severity and danger,

from the low character which the symptoms assume.

This is corroborated by the amelioration in the general aspect of the case within a short time after a patient has been removed to a more open district, or into a well ventilated chamber. Physicians attached to fever hospitals are often struck with the marked improvement under such circumstances. The amelioration is not to be imputed to the treatment pursued so much as to the effect of a more pure atmosphere and the frequent ablution and changes of linen, which are so essential in fever.

At other times the type of an entire epidemic is typhoid, and of such epidemics there are many recorded histories; hence the importance of endeavouring to ascertain, after the example of Sydenham, not only the character of fever in different localities, but the nature of the epidemic at different seasons, that the physician may successfully apply those principles of treatment which the type of the fever requires.

There can be no doubt of the existence of every intermediate gradation between the common forms of fever *(synochus)* and typhus, so that it often becomes a matter of nicety to discriminate to which class a particular case or number of cases properly belongs. Sometimes we find, indeed, the one form passing into the other, more frequently mild fever lapsing into typhus.

There is, in general, a perceptible difference in the severity of the symptoms in different

cases of typhus. This has led to the distinction, proposed by Cullen, of Typhus Mitior and Typhus Gravior.

In typhus mitior the febrile symptoms are mild, though it is evident from the intellectual disorder and prostration, that the nervous system is much affected. It is probable that in these cases, especially at the commencement, there is no inflammatory action in the brain,—the whole phenomena, viz. great languor, feeling of debility, muscular prostration, soft feeble pulse, giddiness, intellectual dulness, and transient delirium, being the result of the peculiar operation of the febrific causes on the nervous system.

Subacute inflammation of the brain often supervenes on this condition of the nervous system; and when this takes place, the more prominent symptoms of cerebral inflammation are recognized; and to the difference in the intensity of the cerebral affection may be traced the infinite variety of nervous symptoms which individual cases present.

Of the lesions in other organs which arise in the more severe cases of typhous fever (*typhus gravior*), congestion or inflammation of the mucous membranes, bronchial and intestinal, and inflammation of the parenchyma of organs, are the most important. The congested state of the capillaries of the mucous membranes, the blood being at the same time in a state which favours its transudation, occasionally gives rise to hemorrhage from different parts, more frequently, however, from the

bowels than from either the nose, lungs, or any other cavity; and when the hemorrhage is excessive, the already exhausted powers of the patient are often irrecoverably sunk. A similar hemorrhagic action is not unfrequently manifested in the skin, in the form of small red spots *(petechiæ)*. These vary in colour and size; they are sometimes of a bright red, in other cases of a darker red or even purple hue, and generally distinct; in some instances the spots cohere, and form an ecchymosis of greater or less extent. These patches are termed *vibices*.

In cases of still greater malignity, carbuncles and gangrenous inflammation of the skin, more particularly on those parts which are subjected to pressure, often arise: and the lymphatics, more particularly the submaxillary, cervical, and inguinal, and in some cases the parotid glands, become inflamed, the cellular substance in which they are imbedded not unfrequently suppurating, and thus forming what some writers have considered a critical abscess. At particular seasons also, erysipelas is very apt to supervene, but more particularly in hospitals,—erysipelatous inflammation rarely supervening on fever among the better classes.

From the peculiar changes which take place in the blood in typhous fever, and to which many pathologists of the present day ascribe all the phenomena, the secretions are more vitiated than in the other forms. This is exemplified in the remarkable fetor of the breath

and perspiration, which is so peculiar as to be readily recognized, and in the evacuations from the bowels, which are always exceedingly offensive.

After these general observations, we are prepared to enter on the particular symptoms.

Symptoms of typhous fever.—It has been already stated that a distinction of typhous fever has been made, founded on the difference of intensity of the symptoms. The invasion of the milder form *(typhus mitior)* corresponds very much with that of common fever. The patient complains of giddiness, listlessness, and indisposition to exertion, alternate chills, and hot flushes, with uneasiness or pain at the pit of the stomach. These precursory symptoms are succeeded by pain in the back and loins, burning heat of the skin, flushing of the face, sense of weight in the head or giddiness, noise in the ears, and disposition to quietude. The expression of the countenance indicates intellectual dulness. The pulse is frequent and soft; the digestive organs are deranged; food is disliked; cold acid drinks are relished; the tongue is coated with thin white fur, which becomes gradually thicker and of a brown colour, sometimes it is clean but morbidly red; the mouth is clammy from superabundant secretion of mucus in the throat and mouth; sometimes there is pain in the epigastrium, nausea, and vomiting. Towards the third or fourth day, the symptoms in the brain become aggravated, the head feels more heavy,

the mind is more confused; the patient, restless and watchful through the day, becomes delirious at night, while, according to some writers, an eruption of miliary or larger vesicles, with intervening redness of the skin, appears on different parts of the body.

The disturbance in the intellectual powers gradually increasing, the delirium, which was only perceptible at night, is observed to recur at intervals during the day; the hearing becomes dull; the patient more torpid; the answers given to questions evincing hesitation and marked indifference to surrounding objects. About this period epistaxis occasionally takes place; petechiæ appear in different parts of the skin, more especially on the chest, abdomen, arms, back, and thighs. This petechial eruption is not constantly observed in typhous fever, but seems to form an occasional characteristic of some epidemics; and from this circumstance the disease has been termed *petechial fever*. Dr. Stoker states that, of five hundred and forty patients received into the Cork-street Hospital, three hundred and eighty-six had petechiæ. In the London Fever Hospital, the cases now (June 1832) under treatment have almost invariably the petechial eruption.

These spots or exudations of blood are not confined to the skin, but spread over the serous and mucous membranes; hence, in fatal cases of petechial fevers, the surface of the viscera have been found studded with small bloody effusions.

The condition of the alimentary canal in typhous fever is various, not only in different individuals, but in different seasons and epidemics. Sometimes the bowels are torpid throughout the whole period of the disease; in other cases there is diarrhœa from the beginning, which only disappears with the cessation of the fever. The urine is always scanty and high-coloured, and towards the decline usually deposits a sediment.

This is the usual progress of typhous fever for the first nine or ten days, about which period another train of symptoms appear—those denoting collapse or failure of the powers. This stage is announced by the decline of the previous more acute symptoms—by the pulse becoming more rapid and soft—the tongue dry and brown, often tremulous and protruded with difficulty—by the incrustation of the teeth with sordes—by the increasing intellectual disorder, indicated by the more constant low muttering delirium, and the greater insensibility and deafness—and by the condition of the muscular system, evinced by muscular tremor and subsultus tendinum, and in some cases irregularity or intermission of the pulse, by the patient lying sunk on his back, or sliding to the foot of the bed, the muscles being unable to support the body even in the horizontal posture.

From the stage of collapse the patient not unfrequently recovers, the period at which this favourable change takes place being very uncertain; it occurs in some instances about the

fourteenth or fifteenth day, but often not till a much later period, depending on the more or less tedious character of the epidemic, and the complications which may have arisen. It is announced by progressive amendment in the symptoms, by the delirium and other symptoms of sensorial disturbance disappearing, the patient enjoying intervals of refreshing sleep; by the countenance improving, and the evacuations being passed consciously, the pulse becoming more slow, the skin cool and soft, and the tongue more clean at the edges and moist over the body. When these favourable appearances are observed, the convalescence, though slow, is gradually established, the individual, however, remaining in a very weak state for a long time.

The progress of the disease to a fatal termination is indicated by coma, more or less profound, hiccup, retention of urine, or involuntary evacuation of the urine and stools, and tympanitic distension of the abdomen.

A modification of typhous fever has been described by Dr. Armstrong under the name of *congestive typhus*, which, in the opinion of this writer, differs from the more common forms of the disease. This theory presumes that the functions or structure of some important organ are deranged by an almost stagnant accumulation of blood in some part of the venous system. There is no re-action; the system does not recover, or only imperfectly, from the first shock or stage of oppression, the energies of the system being either nearly

extinguished by the venous congestions, or so much oppressed as to be unable to create excitement. The local accumulations of blood in the veins are supposed to obstruct from the beginning the common series of febrile phenomena; and there is, in consequence, either no morbid heat of skin, or the heat becomes concentrated in some particular parts of the body, while on others it is below the natural temperature. This form, according to this author, is characterized by the sudden invasion, by the overpowering lassitude, muscular feebleness, deep pain, giddiness, or sense of weight in the encephalon; pallor of the countenance; anxious breathing; cool skin; low, struggling, and variable pulse; irritable state of the stomach; mental dulness, apprehension, and confusion, rather than delirium; heavy suffused eye, as if from intoxication or want of sleep; rough, foul, and dry brown tongue; the bowels, torpid in the beginning, becoming in the advanced stage generally loose; the stools copious and involuntary, and accompanied with inflation of the abdomen. The general torpor causes diminution or suspension of the secretions, and such deficiency of cutaneous excitement, that if blisters be applied, they either do not act at all, or so defectively, as to leave an appearance as if the part had been slightly seared by a heated iron. Petechiæ generally appear earlier in this than in any other varieties of typhus, and in the last stage there are sometimes gangrenous spots on the extremities,

oozing of blood from the mouth and nostrils, and hemorrhage from the bowels.

Dr. Armstrong has described several modifications of congestive typhus, all of them recognized by the depressed state of the heart and circulation—the uneasiness in the head—the præcordial anxiety—the peculiar condition of the temperature and skin—the total want of excitement, or its partial and unequal development—the suspended or vitiated secretions—and the local load and general oppression.*

When typhus fever becomes complicated with local inflammation, constituting the *typhus gravior* of Cullen and others, the symptoms from the commencement are more severe, and when the cause of this severity is investigated, it will be found to depend on the inflammation which has arisen either in the brain, in the lungs, or intestines.

1. The cerebral complication is known by the more marked and early affection of the brain—the more deep or severe pain, or sense of weight in the head, giddiness, or oppression—suffusion of the eyes—more constant delirium, and disposition to coma—muscular tremor and subsultus tendinum—soft, rapid, and occasionally intermitting pulse—and involuntary evacuations.

2. There is invariably bronchitis in the more severe cases of typhus. It is generally very obscure from the absence of the more pro-

* Practical Illustrations of Typhous Fever, by John Armstrong, M.D.

minent symptoms, so that if it be not indicated by cough and accelerated breathing, there is nothing to lead to the suspicion of pulmonary disease. The application of the stethoscope, however, will enable the practitioner to discover the bronchitis, sometimes confined to an entire lobe, or in more severe cases extending over both lungs. Not unfrequently, but especially in the winter, and during some epidemics, pneumonia supervenes, and rapidly destroys life.

3. The state of the intestinal canal forms another important feature in the class of fevers under consideration. The symptoms by which the intestinal affection in fever is attended, we have seen to be very obscure; but its existence may be inferred, when the tongue is morbidly red at the point and margins, while the body is dry, fissured, and covered with dry, brown, or black incrustration; when the belly is tympanitic, and there is hemorrhage from the bowels. There may or may not be abdominal tenderness on pressure; more commonly, and particularly when there is much sensorial disturbance, the sensibility is so blunted that the patient does not feel inconvenience even from firm pressure.

CHAPTER III.

Morbid Anatomy of Continued Fever.—1. Morbid Appearances in the Brain; 2. Morbid Appearances in the Chest; 3. Morbid Appearances in the Abdomen.—Pathology of the Fluids in Continued Fever.

Though morbid anatomy has not yet unfolded the true nature of fever, more sound views of its pathology and treatment have been obtained, by comparing the symptoms during life with the morbid appearances found on dissection. Before examining the morbid appearances in each organ, it is necessary to premise, that in some instances of sudden and early death from fever, no changes of structure sufficient to account for the fatal issue have been discovered. We are to conclude, therefore, that in these cases the duration of the febrile excitement had been too short to produce any appreciable alteration of structure in any organ.

1. *Morbid appearances in the brain.*—The *dura mater* is scarcely ever altered in appearance, though in some cases a small quantity of serous fluid has been found between this membrane and the arachnoid. Louis observed in one case the inside of the dura mater lined with a thin pseudo-membrane.

In the majority of cases, the *arachnoid membrane* exhibits traces of previous inflammatory action; it is sometimes simply vascular, in other cases thickened and opaque, with more or less effusion between it and the pia mater. The fluid varies in colour and consistence. It is generally transparent and colourless; but in instances in which the previous inflammatory action has been more intense, it is opaque, of a light straw colour, and of greater consistence, approaching to the nature of coagulable lymph.

In the ventricles there is generally a small quantity of serous fluid, varying from one or two drams to half an ounce; it rarely amounts to an ounce.

The vessels of the *pia mater*, which often adheres in points to the arachnoid membrane, are generally more numerous, distended, and tortuous than in the natural state of this membrane, especially in those cases in which the other parts of the brain exhibit traces of vascular turgescence. According to Louis, the injection of the pia mater is greatest in the rapidly fatal cases, and serous effusion in those of which the progress has been more slow.

The consistence of the *substance of the brain* in fever is variable; sometimes it is extremely soft, so that it lacerates easily; in other cases it is unusually firm. It is difficult to determine how far these opposite states indicate of themselves the previous existence of inflammation. Louis does not seem inclined

to believe that either condition is to be considered as the result of inflammation, as the change is uniform throughout the whole brain, and the symptoms during life do not bear an invariable relation to the appearances in the brain after death.

Injection of the substance of the brain is not unusual, the vascular turgescence being observed in a larger proportion of cases in the medullary than in the cortical portion. The blood-vessels are not only more distended, but more numerous, as may be observed on making a section of the brain so as to expose the centrum ovale, when numerous bloody points, the orifices of divided arteries, are interspersed, giving the section a dotted appearance.

The *cerebellum* seldom exhibits any alteration, if we except that of the membranes at the base of the brain, and the effusion with which it is frequently associated. A slight degree of softness of its substance has in some cases been observed.

The *spinal cord* has not undergone that minute investigation which would enable us to speak with certainty as to its general state in fever. When the medulla oblongata is divided, so as to allow the removal of the brain, a quantity of serous fluid escapes from the vertebral canal in those cases in which there has been considerable effusion in the ventricles. The membranes which envelope the spinal cord have been occasionally found vascular, the substance of the medulla spinalis being at the same time injected and softened.

With regard to the proportion of cases of fever in which lesions of the brain have been discovered after death, Louis, in his recent work, states that besides the case in which the inside of the dura mater presented a thin pseudo-membrane, in *four* there was a little fluid between the dura mater and arachnoid; in *more than half*, the sub-arachnoid cellular tissue was infiltrated with serosity, and *in one half* the pia mater was injected with blood. In *three-sevenths*, the cortical substance was redder than natural; in *six-sevenths*, the medullary matter was injected,—these latter appearances being most striking when death took place at an early stage; in *six* cases, the density of the brain was slightly increased; in *five*, it was diminished. Of fifty-four cases examined at the London Fever Hospital, thirty-seven exhibited evident traces of previous inflammation of the brain.

2. *Morbid appearances in the chest.*—The structure of the *larynx* in fever is generally healthy, unless, as occasionally happens during the period of convalescence, laryngitis or tracheitis supervenes. In the former case, the glottis is found contracted in consequence of œdematous swelling or serous infiltration of the submucous cellular tissue of the epiglottis, or rima glottidis: sometimes the larynx is lined with a thin layer of recent lymph, extending into the trachea. In the latter, the peculiar membrane of croup is observed.

Inflammation of the *pharynx*, followed by abscess, occasionally takes place, and when

the purulent collection occurs in the vicinity of the glottis, the pressure gives rise to the ordinary symptoms of laryngitis. We have known these cases terminate fatally.

In examining the state of the *lungs*, it is necessary to guard against a source of fallacy. The blood appears chiefly in the posterior portion of the lungs; this circumstance has given rise to the idea that the patient had pulmonary engorgement during life. This pseudo-morbid appearance is readily produced by the gravitation of the blood after death, favoured by the position of the body; indeed, were the body placed immediately after death in any other, we should find a similar congestion in the portion of lung which is most dependent.

When bronchitis has existed during fever, the *mucous membrane* exhibits more or less vascularity; this is most perceptible in the trachea and larger bronchial tubes, though, perhaps, throughout the whole extent of one lobe, the bronchial membrane has a more or less dark red swollen appearance, very different from the pale pink colour observed in its healthy state. When the symptomatic bronchitis has been severe, the bronchial membrane of both lobes appears red, and often considerably swollen and thickened, while the smaller tubes are filled with mucus or muco-purulent fluid.

In fatal cases of fever complicated with pleuritis, adhesions between the *pleura pulmonalis and costalis*, with or without effusion of coagulable lymph on the inflamed surfaces, are

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In fatal cases of fever complicated with pleuritis, adhesions between the *pleura pulmonalis and costalis*, with or without effusion of coagulable lymph on the inflamed surfaces, are

the usual morbid appearances. Sometimes there is effusion of serous fluid into the pleural cavity, the fluid being frequently mixed with portions of coagulable lymph, which render it more or less turbid.

When the *substance of the lung* has been inflamed, the appearances vary according to the intensity of the pneumonia. When the fever proves fatal in the first stage, the lung is increased in density, and infiltrated with serous or bloody fluid. When it has proceeded to the second stage, it is solid and dense, and no longer crepitates. In a still more advanced stage, the pulmonary structure assumes a granular appearance, and pale yellow colour, from purulent infiltration. In some instances that peculiar lesion known by the term *pulmonary apoplexy* has been observed.

Lesions of the *heart* are very rarely observed in fatal cases of fever. In some instances, but more especially in the fevers of hot climates, which run on to a fatal termination with great rapidity, the muscular structure has been found softened and attenuated so as to be easily lacerated. Louis states that this affection was uniformly greatest in the instances of rapid death, and was invariably conjoined with a hurried, fluttering, irregular, and feeble pulse. This softening is generally confined to the left side of the heart, though sometimes both sides have been found affected. Other morbid changes have also been observed, but in those instances the organic disease has always been of

long standing, the fever having supervened in the progress of the cardiac affection.

The internal membrane of the *aorta* and some of the *larger arteries* occasionally exhibits a bright red colour. This redness, which occurs in patches of various sizes, is not the product of inflammation, but only the effect of *staining*. This has been proved by the fact, that this appearance may be easily produced by filling a portion of a large artery with blood, and confining it by means of ligatures. Some pathologists have mistaken this staining for arteritis.

3. *Morbid appearances in the abdomen.*—The occasional occurrence of abscess in the submucous cellular tissue of the pharynx in fever has been already mentioned. The *œsophagus* is generally unaffected. Some writers have alluded to superficial ulcerations in both the pharynx and œsophagus. Such morbid appearances however are to be regarded only as occasional secondary affections.

The alterations which take place in the *alimentary canal* are chiefly in the mucous membrane, and follicles of the small intestines.

When the cavity of the abdomen is laid open, the stomach and colon are in the majority of instances considerably distended with flatus—the diameter of the small intestines, particularly in those portions where there are lesions, being contracted, and of a dark colour.

On examining the internal mucous coat of

the *stomach*, it occasionally exhibits some deviation from the healthy state. Louis affirms that in thirteen of forty-six cases examined, the stomach was quite healthy in colour and consistence. In some instances it is injected in patches of various extent; in others, it is partially and sometimes generally softened and attenuated, so that the mucous membrane is easily detached from the subjacent cellular tissue.

In a few instances, ulceration of the stomach has been found. This occurs in a larger proportion of cases in the fevers of France than in those of Great Britain. Andral states that ulceration of the stomach occurred in one-tenth of the cases examined by him at the Hôpital de La Charité: Louis found this lesion in one-twelfth of those he inspected at the same establishment. In the Fever Hospitals of Britain, this lesion is scarcely ever observed, though we find in many cases appearances indicative of previous inflammatory action in the mucous membrane, viz. redness and softening.

It is seldom that the mucous membrane of the small intestines is sound through its whole extent. The *duodenum* rarely exhibits any trace of disease, and may, therefore, be considered less frequently affected in fever than any portion of the alimentary canal. In the remaining portion of the small intestines *(jejunum* and *ileum)* we find more uniform lesions; in the more rapidly fatal cases, or when the whole force of the disease has centred in another

organ, the mucous membrane retains the natural pale pink colour. In general, however, we observe portions of a greater or less extent, uniformly reddened, the tinge differing from a light red vermilion to a deep brown. The redness is usually deeper in the valves than in the intervening spaces, so that if these valves be drawn out, the intensity of the colour very much diminishes or altogether disappears. This red injection of the villous surface of the intestines is generally followed by intestinal hemorrhage. Sometimes, instead of this uniform redness, the membrane is studded with clusters of small red points or dots, which apparently arise from injection of the capillaries, or in some instances from effusion of blood beneath the mucous membrane. The red colour of the membrane, however, is by far the more common appearance, and is more uniform and extensive in the portion of the ileum adjoining the cæcum: it varies in extent in different subjects, often extending for several feet, occasionally over one-half, or even the whole of the small intestines. In the more advanced stage of inflammation of the mucous membrane, the colour assumes a grey tinge, and when this is observed, it always indicates protracted fever. Louis states that he scarcely ever saw the grey colour of the mucous membrane in persons who died before the twentieth day, more generally in those who died from the twentieth to the thirtieth, or even at a still more advanced period of the disease; hence it has been supposed that the grey colour

occurs when the redness of inflammation is passing off, and the mucous membrane is about to resume its healthy colour.

The consistence of the mucous membrane of the intestines is not always uniform. In the majority of instances it retains its natural consistence; in other cases the inflammation produces thickening and pulpiness of the mucous coat. Though softening has been observed in a small proportion of cases only, it is more frequently met with than thickening, and has been more particularly remarked when the fever had been long protracted. It does not, however, appear to be the necessary consequence of inflammation, as it occurs in some cases without redness; that it occurs with both redness and thickening of the membrane, cannot be denied; but, as it is more frequently noticed without either of these conditions, we must conclude that, although we are unable to explain the precise circumstances under which softening of the mucous membrane of the bowels arises in fever, it is not the product of inflammation. We know that it may be produced very soon by corrosive poisons. Mr. Brodie found the stomach of a dog, to which two grains of the oxymuriate of mercury had been given, remarkably softened half an hour after the poison had reached the stomach.

Besides these morbid states of the mucous membrane, vegetations of a red or brown colour, and of extremely soft consistence, are occasionally met with. They lie one above

the other, projecting perhaps three or four lines above the surrounding membrane: they are not very common. We have seen only one case at the London Fever Hospital, and in this subject the vegetations occurred in the lower portion of the ileum. Andral states that he met with them only in the large intestines. Orfila met with a considerable number in the stomach of a person who had taken cantharides.

The tendency of inflammation of the mucous membrane of the intestines to pass into ulceration has been observed by every modern pathologist who has examined the various lesions which arise in the progress of fever.

These ulcerations in some cases succeed to simple inflammation of the villous coat, in which case the ulceration takes place in one or two points, generally in the centre of the inflamed patches; these points become by degrees more numerous and extensive, and at length coalesce so as to form a patch of greater or less extent. The same process may be going on in different portions of the membrane at the same time; and if it happen that the ulceration commences in contiguous portions of the bowel, one or more patches often cohere, and thus form an ulcer of considerable size.

The most common form of intestinal ulceration, however, is that which succeeds to inflammation of the mucous follicles of Peyer and Brunner. These follicles or glands, which in their natural state are very minute, vary in

number and size in different situations. At the pyloric extremity of the stomach they are numerous, but distinct or isolated; hence called *glandulæ solitariæ*, or after the anatomist who first particularly described them, *glandulæ Brunneri*. They gradually diminish in number towards the extremity of the duodenum, in which situation they are larger and more apparent than in any other portion of the bowels. In the jejunum and ileum they become more numerous and form into groups; hence they are called *glandulæ agminatæ*, or *Peyerii*, (Peyer being the anatomist by whom they were first observed.) They become exceedingly numerous towards the lower third portion of the ileum.

The greater vitality of these follicles, compared with other parts of the mucous membrane, renders them peculiarly liable to inflammation and disorganization; hence we find that, according to the stage of fever, hypertrophy, redness, and ulcerations of these follicles are the only morbid appearances. M. Bretonneau has distinguished this form of intestinal inflammation by the term *dothinenteria*, (from δοθιήν, *pustula*, and ἔντερον, *intestinum*.) The glands of Brunner are less frequently diseased than those of Peyer, and if the statement of Louis be correct, viz. that, in other acute diseases, inflammation of the villous coat, as well as enlargement of the mucous crypts or glands of Brunner, are not unfrequently observed, though not so commonly as in fever, but that disorganization of Peyer's glands are never

met with, except in some forms of fever, the changes which take place in these follicles *(glandulæ agminatæ)* may be admitted to be peculiar to certain types of fever, and to constitute their true pathology.

With regard to the situation of these ulcerations, it may be stated that they occur in every part of the intestinal canal, from the cardiac extremity of the stomach to the rectum. They occur, however, more frequently in some portions of the bowels than in others. For instance, they are comparatively infrequent in the stomach, still more rare in the duodenum and jejunum: the most common situation is in the lower third portion of the ileum. In the colon they are occasionally found, though less frequently than in the small intestines.

From the following table drawn up by Andral, an idea may be formed of the relative frequency of intestinal ulceration in different parts of the canal.

Seat of Ulceration.		Number of Cases.
Stomach		10
Duodenum		1
Jejunum		9
Ileum (lower portion of)		38
Cæcum		15
Colon	Ascending	4
	Transverse	11
	Descending	3
Rectum		1
	Total	92

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The ulcerations also vary in several particulars, especially as to number, aggregation, size, and shape. In the stomach there is in general only one solitary ulcer, seldom more than two. In the lower portion of the small intestines they are more numerous, and situated nearer each other than in the upper, in which situation there is often a considerable distance between them: in the ileo-cæcal valve they are generally so closely situated as to form a large patch of ulceration: they are less confluent in the cæcum. As to size, some are not larger than an ordinary pin-head; the more general size is from a split garden-pea to half a crown; but between these sizes there is every intermediate gradation, the structure of the intestine being sometimes completely destroyed for several fingers' breadth above the cæcum, where the largest ulcerations generally occur.

Their form or shape is also various; some are oblong, having their greatest diameter according to the length or breadth of the intestine; sometimes they are circular, occasionally linear. Their number, size, and depth depend on the duration of the fever. In general, when patients die within the first fourteen days, the disease in the mucous membrane, or in the follicles, has not advanced to the stage of ulceration, though from every appearance this subsequent stage would soon have taken place.

When the ulcerations are numerous, large, and deep, we may presume that the fever is of considerable duration,—that it has advanced

beyond the third week. In the same portion of intestine, too, every successive change may often be observed: thus we find in one part the mucous membrane red and swollen; in another, the mucous follicles enlarged; in a third, abrasion of the membrane or follicular ulceration.

Sometimes these ulcers extend chiefly in breadth, but more frequently in depth, destroying in succession the coats of the bowel. When the diseased process has commenced in the follicles, a small spot of ulceration is observed on their summit; the ulcers then gradually extend both in breadth and depth, so as to expose the muscular coat, which then becomes the floor of the ulcer: in process of time the muscular coat is destroyed, the peritoneal covering alone remaining; and should the patient survive, this becomes gradually thinner by ulcerative absorption, and at length gives way, constituting *intestinal perforation*: the escape of the contents of the bowels through the aperture being followed by rapid peritonitis and death.

The symptoms which indicate intestinal perforation are sudden excruciating pain and increased distention of the belly; sometimes vomiting; small, rapid, feeble pulse; shrinking of the features; cold sweats; and death follows generally within thirty-six hours, though some individuals have existed for a longer period.

When the brain has been much affected, the patient is so insensible as not to feel pain in the abdomen, even when the per-

foration takes place: in such instances it may be suspected from sudden alteration in the features, rapid distention of the abdomen, and small contracted quick pulse. In some instances, the adhesion of the portion of the intestine, at the point where the ulcerative process is going on, to some adjoining viscus, has prevented the peritoneum giving way, and the consequent effusion of the intestinal contents into the abdominal cavity.

It appears, as we have already observed, that intestinal ulceration is more common in the fevers of France than in those of Britain, and that they occur more frequently at some seasons than at others. It is probable, too, that they are found in a larger proportion in populous places, as in the large towns, than in villages or the open country. Of fifty-four cases examined at the London Fever Hospital, (1828-1829,) intestinal ulcerations were discovered in sixteen; and in ninety-two cases of two hundred and twenty-nine treated at La Charitè by Lerminier. On what this difference depends, it is not easy to determine.

With regard to the cicatrization of intestinal ulcers, there is now no longer any doubt that this reparative process does take place. Besides the well authenticated example in the case of the late celebrated Beclard, in whose stomach a cicatrized ulcer was discovered at the small curvature, we have the testimony of Troillet, Louis, and other pathologists, on this point; and though we ourselves have never witnessed an unequivocal instance of genuine

cicatrix, the minute detail, by those writers, of the various stages observed during this process, and their accurate description of the appearance of intestinal cicatrix, leave no longer any doubt on this subject; but from the want of diagnostic symptoms to indicate the existence of intestinal ulceration, it cannot be determined in what proportion of cases this reparative process takes place. It is probable, however, that it is a rare termination of such lesions.

The *colon*, in fatal cases of fever, is considerably distended with flatus; it appears to be the portion of intestine in which tympanitic distension usually occurs.

The internal or mucous surface sometimes exhibits evidence of previous inflammation in the red, softened, or thickened state of this membrane. The mucous follicles are occasionally enlarged; and ulcerations, chiefly in the cæcum, are now and then observed.

The *mesenteric glands* are almost invariably diseased: when there is no intestinal ulceration, they are simply enlarged and indurated; when ulceration of the bowels has taken place, these glands, besides being enlarged, generally contain pus.

The *external absorbents*, especially those situated in the neck, axilla, and groin, are occasionally enlarged and indurated. In some epidemics parotid buboes are not uncommon, indicating a malignant form of fever.

The only alteration in the *liver*, which may, perhaps, be deemed peculiar to fever,

is softening; and this is only occasionally observed. In those instances, it is of a pale colour, and so soft as to be very easily lacerated.

The *spleen* is very generally altered in structure in fever. This alteration consists in unusual softness, in some instances to such a degree that the organ is reduced almost to a pulp, and breaks down on the slightest pressure: it is generally accompanied with enlargement, though seldom to any considerable extent, while its colour is changed to a very dark purple or a reddish black.

This softened state of the spleen has been observed in those who perish early, as well as in those in whom the disease is more protracted; it does not appear to have an inflammatory origin, since its capsule is generally sound. From this extreme softness in some forms of fever, more especially typhoid fever, and in diseases of putrescency, such as scurvy, it is probable that a morbid condition of the fluids has a peculiar effect on the structure of this organ, though we know of no symptoms which indicate this particular lesion.

In one case which came under the care of the writer of this article, at the London Fever Hospital, a small circumscribed abscess was found in that portion of the spleen which is connected with the diaphragm. In this instance symptoms of pleurisy of the left side arose in the progress of fever, which did not yield to the ordinary treatment. The patient eventually died; and on dissection, a small

tumour of the size of an egg was observed in the centre of the diaphragm, which gave at first the idea of diaphragmatic hernia. On more close inspection it was discovered to be an abscess in the spleen, which had formed an attachment to the diaphragm, through which it had so far penetrated as to be covered only by the thin transparent pleura. It appeared just about to burst into the left side of the chest. The general structure and size of the organ were otherwise healthy.

Pathology of the fluids.—That the fluids are changed in fever is evident from the altered state of the various secretions, as well as from certain appearances which have been observed in the blood itself. This subject, though of the utmost importance, has been hitherto almost entirely neglected, probably in consequence of the pathologists of the present day being more disposed to investigate the morbid changes which take place in the solids, and consequently to trace the causes of the phenomena of fever to disease in them, rather than to any alteration in the blood itself.

The doctrines of humoral pathology which prevailed for many centuries were not founded on direct experiments, but on vague conjecture, from observation of the constant and uniform vitiation in the fluids. Chemical analysis in those days had not attained the perfection necessary to detect the various changes which the blood and fluids were supposed to undergo; and, in later times, the acknowledged diffi-

culty of such experimental inquiries, with the zeal with which morbid anatomy is cultivated, will account for the slow progress of this department of pathology.

That the blood does undergo changes in fever was always conjectured: that certain changes precede its development, and that certain alterations in its component principles do arise in its progress, is not only highly probable, but, as has been already stated, some modern pathologists do not hesitate to affirm that a vitiated state of the blood is the origin, source, or proximate cause of the disease.

It has been often observed by practical physicians, that the blood drawn from persons labouring under fever differs according to the type and the duration of the disease. In cases which bear the inflammatory character, the coagulum is firm, the fibrine abundant, or in greater relative proportion to the water and albumen: in some instances the coagulum is so dense that little or no serum is separated. This condition of the blood may or may not be accompanied with the buffy coat.

There appears, however, in the progress of fever, to be a gradual diminution of the fibrinous principle; the coagulum being not only small in proportion to the serum, but of a loose soft texture. Upon what this diminution of the fibrine, and of the force of aggregation by which its particles are kept together, depends, neither physiology nor chemistry has yet discovered; all that in the present state of medical science

we do know on this point, are the facts stated. Dr. Clanny has endeavoured by well-contrived experiments to determine with accuracy the relative loss or diminution of fibrine at the various periods of fever, and certainly his investigations on this curious subject deserve attention.*

The changes which take place in the secretions in the progress of fever, and which are so evident to the senses, depend in some measure on the general disturbance which takes place in every organ of the body, as well as on the condition of the blood. It is evident that if this fluid, from which all the secretions originate, be in a morbid state, the fluids which are eliminated from the parent source, must likewise be in an unhealthy state. The changes which the individual secretions undergo in fever have not been ascertained by chemical experiment, the knowledge we have of their vitiation being derived exclusively from observation.

* Lecture on Typhus Fever.

CHAPTER IV.

Of the Crisis of Fever.—Critical Days.—Prognosis of Fever.

From the earliest periods of medicine, the termination of acute diseases, more especially fevers, was observed to be preceded or accompanied by certain appearances or symptoms which indicated a favorable or unfavorable termination of the malady. Hence the origin of the term *crisis* (from κρίσις, judgment), and the days on which these changes occurred were called *critical days.*

The crisis was regarded as salutary when an evident amendment or complete cure accompanied or followed the change; *perfect* when there was an entire cure of the disease; *imperfect* in the case of simple amelioration; and *false* when certain appearances, such as hemorrhage, petechiæ, colliquative sweats, inflammation of the parotids, and carbuncles appeared, as these only portended a more dangerous and probably fatal form of fever.

Those who embrace the humoral pathology

of fever imagine that the termination of the symptoms is produced by some great effort of the system to relieve itself, following the Hippocratic doctrine, that there being always a morbid matter to be expelled, nature was ever endeavouring either to attenuate this supposed morbific material, or to discharge it from the system. The solidists on the other hand contend that the solution of fever is effected by the treatment applied to the local affection, of which the fever is supposed to be symptomatic. Without entering into this discussion, we may observe that the crisis of fever often takes place without sensible evacuation: in a large proportion of cases, however, it is preceded or accompanied by some change in the secretions, or by diarrhœa or hemorrhage.

The urine is well known to exhibit certain alterations in the progress of fever. In the early stages it is diminished in quantity, but without any change in its colour or chemical properties. As the symptoms advance, the urine becomes darker in colour, but does not deposit a sediment till the fever begins to decline, when it is increased in quantity, and deposits a cloud or sediment on cooling. This urinary deposit, which is sometimes copious, appears in the bottom of the vessel some hours after the urine has been voided: from its resemblance to brickdust it has been called *lateritious*, and by evaporation may be collected in minute chrystals of

lithate of ammonia. This sediment is by no means peculiar to patients labouring under fever, but is often observed in the urine of healthy persons, or in those whose function of digestion is impaired. In other instances the sediment is of a pinkish white colour, and to this deposit, which according to Dr. Wilson Philip consists of the phosphates of the urine, the term *furfuraceous*, or *branny*, has been given. He regards both these urinary deposits as indications of returning health, and particularly of the renewal of a free secretion by the skin, which in fevers is generally a favourable symptom. In some fevers terminating favourably, there is an unusual tendency to sweat which only exhausts the strength. In these the furfuraceous sediment is observed, but without removing the fever. This is the case in hectic fever.*

* Dr. Wilson Philip states that the following are the only appearances of the urine, if we except those it assumes in consequence of morbid affections of the urinary organs, which can be distinctly marked :—the pale urine without cloud or sediment —the pale urine with a slight cloud appearing a few hours after it has been passed—the high-coloured urine remaining clear, or having a light cloud formed in it, and depositing usually, a considerable time (from four to twelve hours) after it has been passed, a red crystallized sediment—the high-coloured urine becoming turbid after it has been passed for a short time (from half an hour to two hours), and depositing a light-coloured, sometimes pinky sediment, now and then (after the

The connexion of the favourable termination of fever, more especially intermittents, with free perspiration, was so often remarked by the ancients, that it gave rise to the practice of treating the disease by means calculated to induce diaphoresis, a practice which was followed by the most injurious consequences. They believed the abatement of the symptoms to be entirely owing to the free action of the vessels of the skin; and that consequently, if sweating could be induced, it would have a salutary tendency. On this point it is only necessary to observe, that however beneficial moderate spontaneous perspiration undoubtedly is, permanent abatement of the febrile symptoms seldom follows diaphoresis when artificially induced. When the sweating is so profuse as to induce exhaustion, or when it is partial or clammy, it is unfavourable; and though as a general rule, when critical sweats appear, little should be done, if the strength be evidently lowered, or if there be not corresponding amendment in the general symptoms, they should if possible be checked.

It is remarkable, however, that in those kinds of fever in which there is great weakness, pro-

urine has stood for a longer time) mixed with more or less, if the light-coloured sediment is copious, never with much, of the red chrystallized sediment. In almost every disease, as well as in health, the urine occasionally assumes all these appearances.

fuse long-continued sweating has been often observed to be most salutary. We are informed by Dr. Donald Monro, that in the petechial fever sweating often continued with the best effects for three or four days. Hoffmann also observed, as a peculiarity of this fever, profuse cold sweats of an acid smell, continuing for days and nights, and proving (apparently) a salutary crisis.

When moderate diarrhœa comes on towards the termination of fever, it is generally a favourable circumstance, and ought not to be interfered with. When there has been a disposition to relaxation of the bowels throughout the disease, which is not uncommon in some epidemics in which gastric symptoms predominate, or at particular seasons, the irritation commonly subsides spontaneously; should it even continue through the period of convalescence, provided it do not interfere with the recovery of the patient, it is only necessary that the diet and general management be duly regulated. When the diarrhœa appears to retard recovery, and produce gradual emaciation, the practitioner should never lose sight of the possibility of the affection being the result of inflammation of the mucous membrane of the bowels, or of other intestinal lesions, and therefore requiring the most vigilant care. From these circumstances it appears, that although diarrhœa does occasionally come on towards the close of fever, and in such instances may be said to be critical, yet no positive conclu-

sions can be drawn from this symptom—that when moderate it may be salutary, when excessive it retards recovery, and in many cases appears to indicate some of those intestinal lesions which generally prove fatal.

Though critical hemorrhagies are mentioned by many of the older authors as occasional occurrences in fever, we confess that in our individual experience we have never witnessed such a crisis of fever. The inference is, that the occasional hemorrhagic action (more common in the fevers of hot countries) which has been observed in some cases to take place spontaneously, and to be followed by a salutary effect, has been improperly termed *critical*. We have repeatedly observed such spontaneous hemorrhage from the nose when there was considerable cerebral affection, and always remarked the great relief which followed this salutary evacuation; but we have never met with an instance in which the fever disappeared with the epistaxis. In typhous fever, hemorrhage from mucous surfaces and from the skin (petechiæ) at any period of the disease, but more particularly in the advanced stages, is not unusual. These hemorrhages are never critical; they tend to lower the already exhausted powers of the patient, and always indicate an unusually severe, if not a fatal form of fever.

Enlargement of the absorbents (more especially of the cervical and parotid glands) occasionally takes place towards the termina-

tion of fever. This is more common in some epidemics than at other times, and though resolution generally takes place when the inflammation extends to the cellular tissue surrounding the gland, it terminates in suppuration. Abscesses occasionally form in different parts of the body towards the decline of fever, and have therefore been regarded as critical.

Eruptions of the skin have also been observed towards the decline of fever. The appearance of aphthæ on the tongue, lips, and inside of the mouth, has been thought an unfavourable circumstance in fever, as indicating debility. Though we do not think the supervention of any eruption a desirable event, we have never observed an unfavourable result in such cases as have been accompanied with aphthæ.

Herpes about the mouth and ears towards the termination of fevers is to be regarded as a salutary crisis.

The ancients also believed that fevers had a fixed or determinate duration, and that these terminations happened on certain days in preference to others. The days on which continued fevers are said more particularly to subside, are the third, fifth, seventh, ninth, eleventh, fourteenth, seventeenth, and twentieth. De Haen collected from the writings which have been supposed to be the productions of Hippocrates, the results of the termination of one hundred and sixty-three cases of fever.

Of these it is asserted that more than two-thirds terminated on one or other of the eight days above-mentioned; none occurred on the second or thirteenth day, and only one-third of the whole terminated on the eighth, tenth, twelfth, fifteenth, sixteenth, eighteenth, and nineteenth days.

Of one thousand seven hundred and seventy-three cases of which an account of the days of decline was kept by Dr. Stoker, two hundred and sixty-two occurred on the seventh day, two hundred and twelve on the ninth, one hundred and seventy-three on the eighth; on the fifth, sixth, tenth, eleventh, and twelfth, nearly an equal number, (about one hundred and twenty;) from the thirteenth to the thirty-first days, the number pretty uniformly decreases from eighty-two to two.

From the difficulty of ascertaining the actual commencement and decline of the symptoms of fever with accuracy, besides that the disease is more protracted in its duration at some periods than at others, we are not inclined to consider these observations of much practical value.

Not only did the ancients suppose that fever terminated at certain determinate periods, but Galen affirmed, that after careful observation he had been able to discriminate those days on which fever terminated favourably or unfavourably. Thus he asserted that the majority of fevers terminated favourably on the seventh day, a large proportion on the fourteenth; next in order he placed the ninth, the

eleventh, the twentieth, or twenty-first, the seventeenth, the fifteenth, the fourteenth, the third, the eighteenth, the twenty-seventh or twenty-eighth. The sixth day, according to Galen, was always most unfavourable, fevers which terminated on this day being either in general fatal, the crisis imperfect, or the patient liable to relapse. Other unfavourable critical days were the eighth, the tenth, the twelfth, the sixteenth, and the nineteenth. The thirteenth was regarded as neither favourable nor unfavourable.

We do not enter into these details of supposed critical days, with the most distant wish to perpetuate what certainly appears a fiction, but to endeavour to guard the inexperienced against doctrines which deserve notice only from their antiquity.

It should be remembered that we have no grounds for ascertaining how time was calculated in those early days; besides the difficulty of ascertaining the precise hour or period of invasion, and the time occupied by the gradual and often imperceptible changes which announce the crisis. We know also that the duration of fever varies according to climate and the particular character of the epidemic: besides, we have endeavoured to shew that there are, comparatively, very few cases of fever in which some local inflammation does not exist at the beginning, or arise at some period of its progress, and which most materially interferes with any supposed regular duration.

It must be apparent, also, that the symptoms

of fever may be not only mitigated, but their duration shortened, according to the treatment which has been adopted: indeed, fever is often rendered exceedingly tedious, either from neglect in its early stage, or from the sufferer being placed under circumstances which preclude the possibility of those means being applied which are most effectual in checking the progress of the disease.

These remarks are intended to apply to the various forms of continued fever. We admit that in periodic fevers the paroxysm has a certain duration, and that in the eruptive fevers, (small pox, measles, and scarlatina,) the symptoms have also a fixed period of cessation or decline, unless their regular course be interrupted by the supervention of some local affection, or some peculiarities in the epidemic itself. These circumstances certainly, at first sight, give countenance to the doctrines we are now impugning; but when we consider the many circumstances in which eruptive fevers differ from every other form of acute disease, their almost invariably fixed duration cannot be adduced as an argument in favour of the doctrine of critical days in continued fever.

Prognosis.—Athough a considerable proportion of cases of fever recover, it is to be regarded as a dangerous disease. For the first few days its character may be mild, but symptoms often arise in its progress which place the patient unexpectedly in danger; while, on the other hand, the patient may re-

cover from a combination of the most unfavourable circumstances.

In the first place, the prognosis will depend on the type of the fever, and the complications which arise in its progress. Simple fever, being the mildest, is the least dangerous form; indeed it seldom proves fatal, unless from the supervention of some local inflammation. Of the probable issue of complicated fevers, it may be said that this depends both on the importance of the organ affected, and the intensity or degree of the local disease. Cerebral is more dangerous than pulmonary or abdominal inflammation; and the various intestinal lesions are more dangerous than any form of pulmonic affection. If there be local disease in more than one organ, the prognosis must of course be less favourable than when the affection is confined to a single organ.

Of the prognosis of typhous fever, it may be stated that it is the most dangerous form of fever. Its fatality is materially influenced by the symptoms which arise, by the character of the prevailing epidemic, and the mode of treatment pursued. Indeed, every species of fever varies in severity in particular years, and even in particular periods of the same year. It is not easy to account for such variation in epidemics, nothing beyond the fact having been hitherto ascertained.

In the second place, the prognosis will also, in some degree, be influenced by the age of the individual. It is more fatal at some periods

of life than at others. The following table will give a comparative view of the mortality of fever at different ages. It is abstracted from the records of the London Fever Hospital.

Under 10 years of age there died	14
From the age of 10 to 15	40
15 to 20	118
20 to 25	84
25 to 30	73
30 to 35	25
35 to 40	39
40 to 45	30
45 to 50	29
50 to 55	14
55 to 60	12
60 to 65	6
65 to 70	9
70 to 75	5
75 to 80	2
	500

In the third place, the constitutional powers and previous habits of the individual will also materially influence the probable result of the case. Persons of a robust vigorous frame and sanguine temperament in general pass through fever better than those of a melancholic temperament and feeble powers; and those who have led a temperate life are more likely to escape the ravages of fever than such as have impaired their constitution by intemperance and excess.

In the fourth place, particular symptoms

indicate a favourable or unfavourable prognosis. In acute diseases, and more especially in fevers, it is of great consequence to examine into the various conditions of the pulse. In fever we are to be guided chiefly by its frequency and volume. If it do not exceed 100 or 110 at any period of the twenty-four hours; if it be at the same time soft though not very compressible, and if the pulsations be regular, the indication, so far as the circulation is concerned, may be considered favourable.

The state of the respiration is also to be considered. If it be of natural frequency, or only a little accelerated towards evening, or at those periods of the day when an accession of fever comes on, resuming its natural state when the exacerbation abates, and is not attended with cough, it is favourable. Auscultation generally indicates the presence or absence of pulmonary disease; and as we have already seen that latent pulmonary affections may be going on without any external signs—cough or alteration in the respiration—frequent examinations of the chest by the stethoscope should be made.

In detailing the symptoms and explaining the causes of fever, we have seen the prominent importance of the nervous system: its condition, therefore, must in every instance materially influence the prognosis. If the headach, or giddiness, which almost invariably accompany the disease, continue moderate, or when in its progress they have become severe, but have yielded to appropriate measures—when moderate delirium does not come on

till towards the middle of the second week of the disease, and appears chiefly towards the evening—when the patient enjoys intervals of refreshing sleep—or, if the sleep be protracted, he be easily roused from his slumber—if with these symptoms the state of the eyes and expression of the countenance be natural—or should moderate deafness without pain in the region of the ear supervene, a favourable result may be anticipated.

In no disease does the appearance of the tongue afford more satisfactory information than in fever. If, after it has been covered with thick moist fur, it appear cleaner at the edges, or after having been dry and parched, it become clean and moist round the margin, it is a favourable circumstance—more particularly if this change be accompanied with desire for food and abatement of the thirst, heat of skin, and other symptoms.

Another favourable symptom is the appearance of a warm general perspiration: it must, however, be distinguished from a cold, clammy, or partial sweat, or from that occasioned by external heat.

A moderate spontaneous diarrhœa is often a salutary crisis of fever, and if it do not prove exhausting, should not be interfered with.

The prognosis may in some measure be formed from the posture of the patient. When an individual labouring under fever is able to change his position, and to retain it for any length of time, it is a favourable circumstance, shewing that a degree of muscular

vigour still remains, and that the powers are not unduly exhausted.

The state of the blood, should there arise necessity for venesection, affords an important indication: if it flow readily when the vein is opened, and if on cooling the coagulum be firm and abundant, it is favourable, shewing that the system is in a vigorous state.

The unfavourable symptoms of fever may be classed under two conditions—those of undue or excessive excitement, and those of failure of the vital powers.

Under the first may be classed those symptoms which characterise great febrile excitement, more particularly violent action of the heart and arteries, pungent heat of skin, hurried breathing, headach, excessive thirst, and general functional disturbance. These symptoms are more particularly observed in the fevers of warm climates, in which all acute disorders run a rapid course, and are often very fatal. In such cases the excitement may be general, without any marked disturbance in any organ; and although this general excitement has been known in some instances to prove fatal without inducing any inflammatory complication, more commonly some organ becomes, sooner or later, inflamed, and according to the extent of the lesion produced, the danger of the patient is to be estimated.

When symptoms denoting inflammation of the brain come on, viz. acute pain in the head, delirium, suffusion of the eyes, throbbing of the carotid and temporal arteries, rolling of the

head from side to side on the pillow, drowsiness or coma, the prognosis is unfavourable, especially if such symptoms occur in an enfeebled constitution, which forbids the adoption of such active measures as are necessary to subdue the local disease.

Again, if inflammation of the lungs or pleura, or of any of the abdominal organs, supervene, the particular lesion being recognized by particular symptoms, the prognosis is unfavourable, unless the local affection be speedily arrested. The safety of the individual in all such cases depends on the promptitude and judgment with which the treatment is pursued, and on the powers of the patient being adequate to contend with the disease and the treatment it requires.

The prognosis, however, is not to be deduced from general symptoms alone, but in connexion with the condition of the vital functions. Hence an unfavourable prognosis may be drawn from the following circumstances.

Extreme frequency and feebleness of the pulse, the pulsations, exceeding 120 in the minute, indicate danger; when they exceed 130, the case may be considered nearly hopeless. Intermission or irregularity of the pulse is also a bad symptom. This state of the pulse no doubt depends on spasmodic action of the muscular structure of the heart, arising from the same causes which induce muscular tremor and subsultus tendinum, as we have observed irregularity or intermission of the pulse

accompany the general muscular affection, and subside at the same time under a cordial plan of treatment and opiates. On the other hand, it may happen that fever has supervened on some organic disease of the heart which has given rise to the irregular action: these cases can only be ascertained by stethoscopic examination and the previous history.

The condition of the brain in fever affords many indications both favourable and unfavourable. We have already adverted to those symptoms which may be regarded as favourable. Of those which are dangerous, we may mention early delirium, which, although by no means a fatal, is always an unfavourable symptom. Coma indicates great danger. Muscular tremor of the hands, tremulous motion of, or inability to thrust out, the tongue, starting of the tendons, spasm of the diaphragm indicated by hiccup, great failure of muscular power, so that the patient cannot sustain his position on either side, but lies on his back sunk in the bed; involuntary evacuation of the urine and stools; or the opposite condition—retention of urine and difficulty of swallowing, indicate much danger.

Though the low or typhoid fevers are generally accompanied with symptoms of impaired energy in the brain, it should be kept in mind that subacute cerebral inflammation sometimes supervenes under circumstances of great general debility. Such a combination generally proves embarrassing, the practitioner having to contend with inflammatory symptoms,

while the general powers are enfeebled and exhausted, or, as Dr. Bateman remarks, "the nature of the one affection absolutely contra-indicating the treatment, which the nature of the other as decidedly requires." When convulsions occur (which they do rarely) they always indicate speedy dissolution.

Loss of sight, although rarely observed, is invariably a fatal symptom. Partial paralysis of the retina, indicated by the appearance of black spots, called muscæ volitantes, floating before the eyes, picking at the bed-clothes—or endeavouring to catch or drive away imaginary objects—closure of the upper eyelid, which arises from debility of the levator palpebræ superioris; or the patient going to sleep with the eyelids half closed, may be regarded as alarming if not fatal signs.

Dropping of the lower jaw, so that the patient lies with his mouth open, the jaw-bone falling down from its own weight, in consequence of paralysis of the temporal and masseter muscles—grinding the teeth, which is produced by spasmodic affection of the muscles of the lower jaw, denote great danger.

Another set of unfavourable symptoms which may be referred to the disorder in the brain, are great restlessness, tossing the arms about, and uncovering the body, though the skin be cool.

Any remarkable deviation from the natural state of the respiration or voice in fever is always to be considered unfavourable. The alteration in the tone or strength of the voice, not depending on the dry state of the mouth,

throat, teeth, and lips, which prevents the free use of the organs of speech, arises from loss of power in the muscles of the larynx. When the breathing is hurried without any corresponding disease in the respiratory organs, it is a bad omen, shewing that there is great debility. When there is intense pulmonary inflammation, either bronchitis, pneumonia, or pleurisy, there is considerable danger. That form of pulmonary disease to which the French writers have given the term *latent bronchitis* is always a dangerous and often fatal complication. It is not indicated by any pathognomic symptom, and is only detected by auscultation; and when it occupies both lungs, it speedily destroys the patient. The obscurity of pulmonary disease in fever is often owing to the condition of the brain, and hence the indispensable necessity of the frequent application of the stethoscope in the progress of fever.

The symptoms in the alimentary canal which give an unfavourable aspect, are fiery redness of the tongue, its middle or root, as well as the teeth, being covered with dry, black sordes; or a preternaturally clean, red, dry, or fissured tongue—tympanitic distension of the belly, with or without pain on pressure—exhausting diarrhœa, the evacuations, consisting of light yellow, serous fluid, being passed unconsciously—hemorrhage from the bowels or bladder. These symptoms are always of themselves exceedingly unfavourable, as they indicate severe lesion of the mucous membrane of the intestines, and when accompanied with sympathetic sen-

sorial disturbance, the issue of the case is seldom doubtful.

Another very alarming and always fatal symptom is sudden acute pain in the abdomen, followed by vomiting, rapid distension, collapse of the features, and extremely small, quick pulse. The pain at first is confined to a limited space, but it soon becomes diffused over the abdomen. These symptoms indicate intestinal perforation, which, it is unnecessary to add, is always a fatal event.

There are certain external symptoms in fever which assist the physician in determining the probable issue.

The expression of the countenance always affords an indication of much value; so much so that those who are familiar with the disease can often pronounce with great accuracy as to the condition of the patient from attentive observation of the countenance alone. It is difficult, if not impossible, to describe the various changes in the countenance in fever: they are known only to those who have had much experience in this disease; and a knowledge of them can only be acquired at the bed-side. In mild cases, there is little alteration from its natural aspect, and should any change in its expression take place in the progress of the disease, a sure indication of amendment is an improved expression of the countenance.

In almost every instance patients become thin under fever; and unless the emaciation be excessive, it is a more favourable symptom

than when there is comparatively little wasting of the flesh. When the patient emaciates rapidly, so that he becomes almost a living skeleton, it is generally owing to lesion of some internal organ, very often of ulceration in the bowels. In these cases the prognosis is unfavourable.

We have already alluded to the fetor of the body in some forms of fever. This sometimes arises from inattention to cleanliness when the patient passes his evacuations unconsciously, but more commonly from a vitiated state of the secretions, and consequently of the perspiration. It is always a bad symptom.

Exudation of blood from the vessels of the skin giving rise to petechiæ, or vibices, is an unfavourable symptom, shewing great general debility and relaxation of the capillaries, the blood being at the same time deficient in fibrin. Huxham observes,* "that when black, livid, dun, or greenish spots appear, no one doubts their malignity; the more florid, however, the spots are, the less is to be feared: it is a good sign when the black or violet petechiæ become of a brighter colour. The large black or livid spots are almost always attended with profuse hemorrhagies. The small dusky brown spots, like freckles, are not much less dangerous than the livid and black, though fluxes of blood do but seldom accompany them. The vibices, or large livid

* On Fever, chap. viii.

or dark greenish marks, seldom appear till very near the fatal period."

When parts which are subjected to pressure shew a tendency to gangrene, it is an unfavourable sign: in some cases large sloughs form on the sacrum or hips, and produce so much constitutional irritation as ultimately to destroy life. Coldness of the extremities, denoting failure in the nervous energy, though often observed two or three days before the patient dies, indicates the near approach of death. The same indication may be taken from cold sweats, which are also referable to failure of the circulation and relaxation of the capillaries. When the extremities become cold, the surface bedewed with a cold, clammy sweat, the countenance collapsed, the respiration short, interrupted, or laborious, the fatal issue is not far distant.

CHAPTER V.

Of the Causes of Fever: 1. *Predisposing Causes.* 2. *Exciting Causes.*

It has been well remarked by Dr. John Hunter, in his work on the Diseases of the Army in Jamaica, that the great improvements to be made are not so much in the cure as in the prevention of diseases, which depends altogether upon the knowledge of their causes.

The causes of fever have been usually considered under two divisions. The first comprehends those circumstances which predispose to, or render the body susceptible of the operation of the causes which produce the disease: they are termed *predisposing*. The second includes such causes as immediately excite the fever, and are consequently called *exciting*.

From this distinction it may appear that a certain predisposition is necessary before the exciting causes can produce their effect; or, in other words, that a predisposition must exist, or be engendered before symptoms of fever can be established. Although a certain condition of the system renders the operation

of the exciting causes more efficient, and in some cases contributes essentially to bring on the disease, the exciting causes frequently operate, without the intervention of the predisposing. It has not unfrequently happened that individuals in perfect health, on being exposed to infection, have almost immediately been seized with fever.

A woman admitted into the fever-wards of the Whitworth Hospital stated that on a certain day (Wednesday) preceding the day of her admission, a person not yet recovered from fever came into the house where she then was, and sat down close beside her. She became immediately sensible of a heavy, disgusting odour arising from the person of this individual; was instantly affected with headach and became very weak; and on the same evening, long-continued rigors, followed by heat and perspiration, came on. She afterwards passed through a severe form of fever.

A clergyman, having enjoyed during the morning his usual health, and having performed the customary church-service of the day, visited, before dinner, a small parochial fever hospital. While speaking to a woman recovered from fever, he discovered he was standing on straw just removed from the bed of a fever-patient, in which there was much feculent matter. The odour from thence struck him with force; he immediately felt pain in his head, sickness, and prostration. The same evening he shivered, and fever of unusual severity ensued.

Though little hopes were at one time entertained of him, he ultimately recovered.*

A child, on being discharged from a fever hospital, was admitted into a charitable institution, and brought with her a small bundle of clothes which had not been disinfected. The bundle was opened by a woman resident in the institution, who perceived an extraordinary disagreeable odour to issue from it. In a few minutes the woman became ill, felt sick at her stomach, and afterwards passed through fever.†

Nurses, too, have become so powerfully affected on removing the evacuations of a fever-patient, or from applying dressings to gangrenous sores, as to sicken with fever almost immediately after. Instances of this kind are familiar to the writer, and have no doubt been often remarked by other physicians.

It has been confirmed by experience, however, that when the system is in full health and vigour—when all its functions are duly performed and nicely balanced, it is enabled to resist any powerful morbid impression. As soon as this equilibrium is disturbed—when the powers are enfeebled from any cause which tends to break up the strength, or to destroy that harmony of relation which constitutes

* Marsh on the Origin of Fever, Dubl. Hosp. Rep. vol. iv.

† Barker and Cheyne's Reports, vol. i. p. 472.

health, the same causes which were formerly innocuous, become powerful agents in the production of disease. It is on this principle that attendants on fever patients are enabled to resist infection so long as they continue in full health. Hence an important practical principle is deduced, that those who are engaged in attendance on fever should not approach the sick while any symptoms of even slight indisposition are felt.

In all the instances which have come under our notice, of medical practitioners who have become the subjects of fever, there have been almost uniformly, for some time previous to the origin of the disease, evident signs of disordered health. It very generally happens that when precursory symptoms of fever appear, the struggle made against its insidious approach too often renders the subsequent progress formidable, while under early judicious management the primary symptoms might have soon subsided.

It may be useful to point out a few of the more striking and important circumstances which render the system susceptible of the influence of the exciting causes of fever. We may first notice the particular period of life at which fever most frequently occurs. That some idea may be formed of the comparative frequency of fever at different ages, the following table has been constructed from the register of patients admitted into the London Fever Hospital during one year.

Under	10 years	18
Between	10 and 15	68
	15 and 20	130
	20 and 25	178
	25 and 30	100
	30 and 35	44
	35 and 40	44
	40 and 45	31
	45 and 50	14
	50 and 55	10
	55 and 60	8
	60 and 65	8
	65 and 70	2
	70 and 75	3
	75 and 80	1
	Ages not ascertained	17
	324 males, 352 females ..Total..	676

From this abstract it appears that fever is most common between the ages of twenty and twenty-five, and next between fifteen and twenty. It decreases in frequency from the age of puberty downwards; and as a general rule it may be affirmed that children, and particularly infants, are peculiarly exempt from the exciting causes of idiopathic fever—the febrile ailments to which they are subject being almost invariably symptomatic of some local disturbance, such as dentition and disorder of the bowels. The frequency of fever between the ages of fifteen and thirty may be explained by the development which takes place and the

tendency to plethora in young persons. It may also be stated that the type of fever is apparently influenced by the particular period of life—inflammatory or acute fevers being more common from puberty to the age of forty. It is also modified by individual temperament, persons of the sanguine being most liable to the acute, those of the melancholic to the low forms of the disease.

We have already noticed how much a vigorous state of health contributes to protect the system against the influence of the exciting causes of fever: it consequently follows that whatever tends to impair the health becomes indirectly a predisposing cause. Those circumstances which induce plethora on the one hand, or inanition on the other, may therefore be regarded both as predisposing and exciting causes, according to the duration of their application and the condition of the system at the time they are applied. Of the two, however, scarcity or famine is the most powerful: indeed, in all ages famine and disease have been observed to be co-existent. Hence it may be considered as an axiom, that scarcity of food, as well as food of a bad quality or improper kind, powerfully predisposes the system to the influence of the exciting causes of fever.

In tracing the records of epidemics, it will be found that they have almost invariably been preceded or acompanied by distress among the lower orders, either from the high price of provisions, or from some commercial causes,

throwing the manufacturing portion of the community out of employment. In the epidemic fever which has at various times visited Ireland, all the medical practitioners allude to the inadequate supply of food among the inhabitants of the towns or districts where it raged. Insufficient and unwholesome nutriment, by impoverishing the blood, not only brings on emaciation, but depresses the nervous energy; hence the system, under such circumstances, is readily acted on by the exciting causes of fever. In times of pestilence, therefore, due attention should be paid to the quality as well as quantity of the food, avoiding on the one hand too scanty an allowance, while on the other, the stomach should not be overloaded, especially with stimulating food. We consider a moderate but liberal allowance of animal food to be a good preservative against the exciting causes of fever. This observation is strengthened by the fact, that during the plague, which raged in London in the seventeenth century, the butchers of the metropolis were observed to be remarkably exempt from the disease, and in our own experience this class of persons are rarely the subjects of fever.

The moderate use of wine, by strengthening the body, obviates a predisposition to fever, and therefore, during the prevalence of epidemic fever, has been recommended. It should, however, be strongly impressed on the mind, that the immoderate use of wine or intoxicating liquors, under such circumstances, actually renders the body more susceptible of

the exciting causes. Dr. Chisholm remarks that those who were addicted to intemperance, were most subject to the fever of Grenada; and as every kind of ardent spirits operates as a slow but sure poison, producing great debility, and sapping the powers of the system, it is the duty of every one to discourage their use in the time of epidemic visitations.

Bodily fatigue may be mentioned among the causes which tend to impair the natural vigour of the body, and thus render the system more susceptible of the exciting causes of fever. This may be either excessive and of short duration, as in violent exertion, or it may be prolonged, as in long journeys. It is well known to army surgeons, that soldiers very readily fall into fever, when exposed to its causes, after a long march or severe and continued exertion in the field; and, in times of scarcity and privation, the journeys which whole families are not unfrequently compelled to take in quest of employment and support, render them more liable to be attacked with fever than they otherwise would be.

Another set of predisposing causes are those which give a severe shock to the nervous system. The various kinds of mental emotion—fear, grief, anxiety, disappointments, long continued watching on a sick bed, intense study, want of sleep, may individually be ranked among the predisposing causes of fever. As Dr. W. Philip observes, therefore, few things are better preservatives against infection than

fortitude and equanimity. Nothing, we are informed by those who voluntarily exposed themselves to the contagion of the most pestilential fevers, was found so great a preservative against its effects, as a steady adherence to what they believed their duty, banishing from their minds, as much as possible, all thoughts of danger, and avoiding every kind of passion, particularly the depressing passions. Every body knows how much fear predisposes to infection: on this account it is of consequence to strengthen the faith of the ignorant in the efficacy of any thing they believe capable of preserving against infection.*

The *exciting* causes of fever form a most important and interesting subject of investigation, though it must be acknowledged that notwithstanding all that has been done in this department of etiology, the subject is still involved in obscurity.

There can be little doubt that the opinion, entertained by many, of the exclusive origin of all forms of continued fever in contagion, has tended much to limit our knowledge of its other causes. That fever does occasionally originate in contagion few persons of experience or unbiassed judgement will now deny; but there are other causes which operate with equal certainty, a knowledge of which it is exceedingly important to attain.

The records of medicine contain abundant proofs of the origin of fever in the poison gene-

* On Febrile Diseases.

rated by the decomposition of vegetable and animal matters, though it seems probable from some facts, that the exhalation from vegetable substances in a state of putrefaction is more injurious than that from animals; and from the circumstance of the prevalence of fever in some particular places, and the number of persons who have become affected from residence, even for a short time, in those situations where it has been found to prevail, it has been concluded that fever may arise from a terrestrial or atmospheric poison generated in such localities. To the febrile poison however produced, the term miasm, (from the Greek word importing pollution, corruption, or defilement generally,) or malaria (from the Italian term implying bad or impure air,) has been applied. It is well ascertained that vegetable as well as animal substances, in a state of decomposition, emit effluvia or exhalations which prove extremely hurtful to the human body, and when applied in a state of sufficient concentration are productive of most severe illness, or even of instantaneous death. On this account, all febrile poisons have been supposed to originate in one or other of these sources, or in a peculiar unknown pestilential condition of the atmosphere, to which, from the number of persons simultaneously affected, the term *epidemic* has been given.

We know very little about the physical qualities of these emanations or vapours beyond their noxious effects on the animal body: they are invisible and without taste or smell: che-

mistry has failed to unfold their nature, as on submitting them to the test of chemical analysis, nothing beyond the fact that they contain a considerable proportion of hydrogen and carbonic acid gas has been discovered. Hence some ingenious persons have endeavoured to deduce the unhealthiness of low damp situations in the warm season, to a supposed deficiency of oxygen in the atmosphere, though, as Dr. Bancroft has very justly stated, were we to assume this principle, fever should be produced by every crowded assembly, and in a multitude of situations where no such effects have been observed.

In consequence of fever arising in particular localities, it is probable that noxious exhalations are generated from some soils only, and that the combination of heat and moisture is also necessary for their production. We find, accordingly, that in the same district, one place or spot is unhealthy, while at a very short distance, perhaps, the inhabitants are remarkably free from disease; and that, in some seasons which have been remarkably dry, even when the heat has been unusually great, fever is either little prevalent, or entirely unknown.

Though every soil contains an admixture of animal matters in a state of decomposition, it is probable that the deleterious principle which gives rise to fever is derived from vegetable substances almost exclusively. This opinion is strengthened, if not confirmed, by what is observed to take place during the process of preparing hemp, flax, and indigo, for the vari-

ous purposes for which they are used in commerce.

These plants in their preparation are steeped in water, and during their decomposition extremely offensive emanations arise. Lancisi gives the history of an epidemic fever, which for several summers infested and almost depopulated a town situated in an elevated and salubrious part of Etruria. This fever arose from the emanations from ponds or stagnant waters in the lower part of the town in which hemp and flax were macerated: on the process being afterwards prohibited, there was no recurrence of fever. Dr. Bancroft states he was informed at Naples that in several places near that city, and particularly in some beyond the Grotto of Posilippo, sleeping in houses contiguous to ditches in which hemp or flax were macerating had been almost constantly followed by fever. Similar effects have been observed from the fermentation which the indigo plant undergoes in the process for extracting the colouring matter. It appears that, after the extraction of the dye, large heaps of the plant are formed near the manufactories and houses of the work people, for the purpose of undergoing decomposition so as to form manure. After being frequently moistened by the heavy rains, and heated by the rays of a scorching sun, copious exhalation takes place from these beds of putrifying vegetable matters, in consequence of which the workmen, and persons who live near, were constantly attacked with dangerous fevers. This

circumstance having of late years attracted the attention of the indigo planters, the plant, after the extraction of the dye, is not permitted to be formed into heaps near the works or dwellings of the labourers. Fevers are consequently now comparatively rare among the workmen.*

From these facts it is evident that there are some deleterious emanations emitted during the putrefactive process of vegetable matters. Some have endeavoured to shew, however, that moisture alone, applied to the living body, produces fever. This position has been again and again disproved by the most conclusive facts; indeed, the argument adduced by Dr. Bancroft, of the remarkable healthiness of the men employed in the Newfoundland fisheries, where they are generally enveloped in the dampest fogs for several months together, affords the least ambiguous proof, that the atmosphere when loaded with moisture only, has no greater power in causing fever, than it has when in any usual state of dryness.

It would appear that a combination of circumstances, more particularly heat and moisture, is necessary to give potency to putrid emanations.

Miasmata generate very slowly in a perfectly dry situation; and it has been generally remarked that fevers are not prevalent in dry seasons. Dr. Bancroft states that it is found on the west coast of Africa, and in some of the West India islands which are liable to long

* Bancroft on Yellow Fever.

droughts, as Barbadoes, and more particularly Antigua, that marsh fevers occur very seldom in dry seasons; but that they become very prevalent whenever these droughts are suddenly terminated by frequent rains.

Dr. James Clark, in his Treatise on the Yellow Fever, observes that when there was much rain in the months of May and June, and dry sultry weather prevailed in the following months of July and August, fever raged much among the troops and strangers. This is precisely what is observed in temperate countries.

The effect of heat in promoting putrefaction and the consequent generation of emanations, is evident from the variation observed in the putrefactive process in different temperatures. A very low or a very high temperature is unfavourable to the decomposition of dead inorganic matter, putrefaction being entirely suspended at the freezing point, and proceeding very slowly at any degree under 45° of Fahrenheit: it gradually increases from this point, and appears to take place most readily about 100°, but to be checked when the temperature exceeds 100°. It has been remarked that in districts where marsh fevers are prevalent, their progress is arrested, and in many places they entirely disappear during a continued frost: when spring advances they reappear in a mild form; in summer they prevail more extensively; and in autumn the cases not only increase in number, but assume a more severe form. Precisely the same thing happens with

regard to the continued forms of fever, so that the combination of heat with moisture must be admitted to be a powerful circumstance in the production of fever.

It is necessary, however, to state that paludal emanations are generated in greater quantity, and probably in a state of greater concentration, when there is only such a degree of moisture as facilitates putrefaction.

It is well known, that in marshy districts fevers do not appear in the rainy season till the water has nearly evaporated or drained off. Attention to this important fact will, as Dr. Bancroft states, enable us to understand, why in some countries frequent and heavy rains render marsh fevers prevalent, while in others the deprivation of rain for two or three months produces equally morbid effects.

We have just noticed that in very dry seasons fevers are seldom observed. The fact that in very low situations, where the ground is much moistened and often inundated in the rainy seasons, the inhabitants remain free from fever till the water evaporates from the heat of the weather so as to leave the ground in many places uncovered, explains the comparative insalubrity of situations in the vicinity of stagnant waters compared with running streams. In the third volume of the Journal de Physiologie, an interesting account is given of a fever which occurred in the autumn of 1822; its origin was ascribed to exposure to the emanations of stagnant waters, and using

the same water in food. The symptoms of the fever were pain in the epigastrium, purging, distention of the belly, feeble pulse, thirst, black furred tongue, fetid sweats, and great prostration. The convalescence was remarkably tedious. Hence the expediency of occasionally inundating a marsh in hot weather, when any deleterious exhalation arises.

There is considerable difference in the various kinds of soil as regards the generation of emanations. Fevers have been generally remarked to be more common when clay constitutes a considerable proportion of the soil. Whether this is owing to the greater humidity of a clayey soil, or whether it favour the putrefactive process more than other kinds, is yet a matter of conjecture.

We may here allude to the singular exemption of persons who live near peat-bogs or moors from marsh fevers; this has been observed to be remarkably the case in some districts of Scotland and Ireland. The cause of this apparent salubrity in the districts referred to has not been satisfactorily explained, but it is well known that peat-bogs have the remarkable property of preserving both dead animal and vegetable matter from putrefaction. According to Dr. Bancroft, not only plants and trees, but even human bodies with their clothing, when completely immured in the peat soil, will scarcely undergo any change during a long course of years; and it is probably owing to this peculiar property that they do not exhale, and perhaps do not generate, miasmata

similar to those which arise from marshes. Some chemists who have made experiments with a view to discover the nature of peat, are of opinion that its antiseptic powers are derived from *tannin*, though from a certain quantity of iron being always found in peat, it is probable that this metal may have a considerable share in contributing towards its antiseptic properties.

From what has been stated, it is evident that not only the origin but the propagation of fever depends on a great variety of circumstances, which, in tracing the causes of the disease in any particular locality, should be minutely investigated.

It is often found that fever is confined to a limited district, so that one part of a town is sickly while other districts are healthy. This has been repeatedly remarked in the malarian fever which prevails in the summer and autumn at Rome, the disease appearing chiefly in the low parts of the city near the river, while the other districts are quite free, unless when the wind blows in the direction of the Pontine Marshes. Particular streets have been observed to be more unhealthy than others; and it has been said that fever has run through every house on one side of the street, while the inhabitants of the opposite side escaped.

Ample proofs of the injurious effects of emanations from vegetable substances in a state of putrefaction on the living body having been adduced, let us next examine into those arising

from the decomposition of animal matter. It would appear, however, from the immunity of persons exposed to the effluvia of dead animal matter, that its application to the living system is rarely followed by any injurious consequence. Persons who are much exposed to animal putrefaction, such as the men who are employed in particular trades, skinners, parchment-makers, catgut and glue-makers, nightmen, and students of anatomy who are engaged for several hours daily in prosecuting their anatomical studies, are seldom known to suffer from their occupation. The same immunity is not enjoyed by persons who are long enough exposed to the effluvia from putrid vegetable substances. It is true that persons who have been engaged in the removal of corpses from burying-grounds, and nightmen, have suffered from their occupation; but the disease occasionally induced in them does not appear to have any resemblance to fever.

Fourcroy states that in some of the burial-grounds of France, when the grave-diggers in opening the ground penetrate graves in which bodies have been recently placed, they become affected with vertigo, sickness, tremors, and a feeling of oppression; in some instances they become asphyxiated: it has also been observed that numbers of those who live in the vicinity of cemeteries labour under dejected spirits, sallow countenances, and febrile emaciation.

The human body, not only when affected with disease, but under certain circumstances in a state of health, generates a poison which

gives rise to fever. This principle, notwithstanding the reasoning of ingenious disputants, has been incontrovertibly established by a multiplicity of facts.

There can be no doubt that the most potent febrile poisons are the exhalations from the bodies of persons labouring under some form of fever. The proofs on this point are so clear and satisfactory, that few persons deny that fever originates in contagion. To assert that contagion is the only principle capable of producing the disease evinces a very limited notion of the circumstances under which fever is generated; and yet this opinion was taught by Cullen, and is implicitly believed by many even in the present day. It is almost as absurd as the idea still entertained that fever cannot be propagated by contagion. Sir John Pringle states that he has observed the hospitals of an army, not only when crowded with sick, but at any time when the air is confined, and especially in hot weather, produce fever of a peculiar kind which is often mortal. The same thing has been observed in almost every hospital, and shows that the congregation of sick persons does, under some circumstances, produce fever.

It is not necessary however that such exhalations, in order to generate fever, should arise from the bodies of persons in a state of disease: it is well known that fever is readily produced by the accumulated emanations of healthy persons. Sir John Pringle mentions that he had observed fever arise in full and crowded

barracks, and in transport-ships when filled beyond a due number, and detained by contrary winds, or when the men had been long kept at sea under close hatches in stormy weather.

We have frequently observed that the febrile poison becomes so virulent in a confined atmosphere, that every person who has been exposed to its influence has been attacked with fever; and as if to show the agency of a specific poison, the symptoms in every individual who has received the infection have been remarkably similar.

It is this concentration of human effluvia which is so productive of fever in crowded ships, prisons, and workhouses, more particularly in warm weather, and when little attention is paid to ventilation; for it should be remembered that the febrile poison may be so diluted by pure air as to be rendered almost innoxious. Few parish workhouses, when overcrowded with paupers, especially in the summer months, escape the visitation of fever; and when an epidemic appears in a large town or manufacturing district, the ravages which it commits in the crowded ill-ventilated dwellings of the poor are often appalling.

The facts which have been accumulated from the most authentic sources prove that fever may be communicated from person to person by contagion. It does not require actual contact to produce the disease; exposure to the atmosphere of the apartment, but more especially to the exhalation from the body of

a fever patient, being sufficient. In the article CONTAGION, (to which we refer for more ample details,) such abundant illustrations have been brought forward, that the most sceptical must be convinced of the origin of fever in this source. We certainly think that Dr. Marsh, in his paper on the origin of fever,* has brought forward a body of evidence which should alone decide the question. The facts there collected are corroborated by the experience of every fever hospital as to the medical officers, nurses, and immediate attendants on the sick, and every inmate of the establishment, of whatever description, being with few exceptions affected with fever. We have known many instances of nurses pointing out the very patient from whom they received the infection; others have been sensible of a sudden and particular impression at the moment the poison was received. This impression has been sometimes from the fetor of the body, not unfrequently from the stools, or in removing the linen of the patient.

Persons in a state of full health and vigour are much less likely to become affected with fever, than those whose powers are exhausted. It is thus that the nurses and attendants in fever hospitals resist for a time the febrile poison; but after a longer or shorter exposure, more especially if the strength has been impaired by bodily fatigue, want of sleep, and close confinement to the sick room, they almost invariably lapse into fever—a convincing proof

* Dublin Hospital Reports.

that whatever weakens the general strength tends to render the operation of the exciting causes of fever more certain and effectual.

Any undue mental fatigue also powerfully aids the operation of the exciting causes of fever; and we have often verified the remark of Dr. Marsh, that in such cases the violence of the disease falls on the brain and nervous system, producing what is emphatically termed *brain fever*.

In the same manner we may explain satisfactorily the rapidity with which contagion spreads in times of scarcity or famine. The poor under such lamentable visitations are generally exposed to circumstances, which render them readily affected by causes which under more favourable events would be inoperative. Fatigue, exposure to cold and wet, insufficient or improper kind of food, are the too general attendants of epidemic fever among the poor.

Though mental emotion of a depressing kind powerfully predisposes the system to fever, it is singular how much an unusual degree of excitement acts apparently as a preventive. It is not unusual to observe that, during the painful anxiety and suspense, between hopes and fears as to the recovery of a valued relative and friend, the body is as it were armed against the effects of contagion. When this state of excitement is withdrawn, it is frequently followed by the same disease which was the cause of such intense anxiety, as if, in short, the system became relaxed so

as to receive the influence of the infection to which it had been exposed.

From what has been stated, it is evident that when there is any indisposition, exposure to contagious fever should be avoided.

The means of guarding against contagion must at once suggest themselves. These consist in ventilation, separating the healthy from the sick, avoiding the effluvia from the skin, from the breath, and more especially from the evacuations; in adopting a nutritious but not stimulating diet; and in preserving moral courage,—fear, as we have stated, always predisposing the system to infection, so much so, that during the prevalence of an epidemic disease the terror it induces tends materially to increase the number of its victims.

The following brief sketch of fever originating in long-continued mental anxiety, by Dr. Cheyne, vividly describes a not infrequent and somewhat peculiar form. "The *causes* are loss of property, of character; wounded pride. *Invasion* insidious, indistinct, patient generally unable to assign the date of the commencement of the attack; for some time before he has been complaining of bad nights, or has had symptoms of a common cold, which almost insensibly degenerate into the proper symptoms of fever; then, from an ignorance of the nature of his illness, he neglects himself, perhaps for many days; and at last when visited by a physician, he appears utterly unconscious of the formidable nature of his disease, and pro-

bably says he has no complaint—he is merely very weak: the symptoms are those of the typhus gravior of nosologists; a red suffusion of the eye; prostration of strength; subsultus tendinum; quick and weak pulse; hurried breathing; dun petechiæ, or a mottled or morbillary state of the surface. Of such patients a great proportion die. The most remarkable part of the disease is that it does not spread." Dr. Cheyne has no recollection of a second case of this kind of fever occurring in a family, and he has never been able to discover that the patient had been exposed to contagion. It would seem to arise solely from mental causes.*

Few circumstances connected with the causes of fever have attracted more attention than its tendency to become epidemic and to prove malignant and fatal at particular times, while at others the disease is little prevalent and of a mild character. These variations in febrile diseases have existed in all ages; they were particularly remarked by Hippocrates, who ascribed them to something divine, in which idea he was followed by Galen. In more modern times, these differences have been ascribed to the influence of some atmospheric or terrestrial agency, of which little or nothing is known except the effects it produces in the propagation and malignity of diseases. The notion that such pestiferous causes depend

* Marsh on the Origin of Fevers, Dub. Hosp. Rep.

on planetary influence has been long exploded, though they appear to have an intimate connexion with sudden and extreme variations of temperature, more especially excessive heat combined with moisture. It is by no means uncommon to observe the prevalence of fever sensibly checked when the air is dry and cold.

Other contagious diseases as well as fever become epidemic and malignant at particular periods. This has been more especially observed with regard to small-pox, measles, and scarlatina, which, though never extinguished, are more frequent at some periods of the year, as well as more malignant at certain seasons than at others.

It is probable, therefore, that the circumstances which contribute to the prevalence as well as malignity of febrile diseases, operate by increasing the predisposition, or by rendering the body more susceptible of the influence of their various exciting causes. Hence the obvious effect of living in confined places, or of scarcity, or of any causes that undermine the powers of the system, in rendering the exciting causes of fever operative.

Not only is there a great difference in the number of persons affected with fever at particular times, but there is often, also, a remarkable similarity in the symptoms. Thus in the winter and spring months, the fever is of a more acute character, and generally complicated with cerebral or pulmonary inflammation. In the autumn, they are of a less active

kind, and accompanied with more or less gastric irritation.

It is impossible, in the present state of our knowledge, to account for these various modifications in the character of fever, though it is of the greatest importance to observe them with the view of regulating the treatment.

Climate has an important influence, not only in giving a predisposition to fever, but in modifying its character or type. The inhabitants of warm climates are more liable to fever than those who reside in cold or temperate countries. The symptoms also are generally more violent, and the progress of the disease more rapid, while the type of the fever is very liable to change. The predisposition to fever, however, diminishes by continued exposure to its causes, and hence the immunity frequently observed in the natives of warm climates, while strangers or new comers are almost invariably attacked soon after their arrival, with the peculiar fever of the country.

We have already alluded to the effect of heat in the production of fever. The negative principle *cold* has been usually placed among the exciting causes. Though, undoubtedly, cases of mild fever may be traced to exposure to cold, it is more probable that it acts as a predisposing cause, especially when the body is weak, and little able to resist its effects. Dr. Marsh is of opinion that cold, like contagion, is an impression made on the sentient extremities of the nerves; its effects are in like

manner instantaneous; its action, though powerful, is resisted when the body is vigorous and strong, but its impression upon those who are exhausted, fatigued, or relaxed, is followed very frequently by consequences formidable and even fatal.

It appears from some facts which have been noticed, that while some individuals are enabled to resist the operation of the exciting causes, others are only indisposed in a peculiar and indefinite manner after exposure to them, as if there were a struggle in the system to obviate their effects.

Fever, moreover, has been apparently induced by exposure to other acute diseases. Dr. Marsh mentions the case of a nurse in Stevens's Hospital, who was suddenly seized with illness while in the act of turning in the bed a boy labouring under confluent small-pox. She remained ill but not incapacitated for business for three days. She then had rigours followed by severe fever, the ordinary typhus of this country. Dr. Johnson asserts that he observed in some instances that the ward-maids of the lying-in hospital caught typhous fever from the patients then affected with puerperal fever.

It would be exceedingly important if the mode in which the various febrific causes produce their effects could be satisfactorily demonstrated. It appears evident, from attentive observation of the general characters of fever, that there is occasionally a very remarkable

difference in its forms or types, as well as in the particular symptoms on which its distinctive varieties have been founded.

The local lesions or complications, we have seen, assume remarkable variation in certain seasons and in particular epidemics, both in respect to the organs individually affected, and in the degree or intensity of such local inflammations. These circumstances lead to the belief, either that the febrile poison is different at different times, or that it is so modified by the state of the system as materially to alter its effects. The former is the more probable explanation, though from the nature of the febrile poison such difference cannot be demonstrated, but is only rendered probable from its effects on the human body.

Though it is impossible to explain the operation of all the exciting causes of fever, there appears to be a very close analogy in the action of many to that of other poisons. We know that this class of agents (poisons) affect different structures: the narcotics, for instance, act on one organ—the nervous system; others have a twofold action, as in the instance of the acro-narcotics, which evidently operate both on the nervous system and on the mucous membrane of the bowels, giving rise in the former to peculiar symptoms of narcotism, while a more severe effect is produced on the latter—inflammation and its consequences.

It cannot be demonstrated, but it seems more than probable, that some of the febrile poisons, whether originating in animal, vege-

table, or atmospheric miasmata, operate on particular structures.

In some cases it would appear that the brain and nervous system are the only organs affected by the febrile poison; at all events, the nervous system appears to be early, if not primarily disturbed, as is evident from the shock which the whole system receives on exposure to some of the causes alluded to.

The symptoms in the brain are not, however, always the effect of the primary action of febrific causes on this organ. The nervous system is so susceptible of distant sympathetic impressions, that there is often great difficulty in distinguishing primary from secondary cerebral disease in fever. When there is intestinal affection more especially, the brain always sympathises; in which case it is often a nice point to determine whether the cerebral disturbance arise from the peculiar operation of the febrile poison on the nervous system, or whether it be only sympathetic of the morbid condition of the alimentary canal.

Again, fever assumes particular forms at different seasons of the year. It is well known that in some epidemics, and at certain seasons, the mucous membrane of the air-passages is affected, the existence of this form of fever being indicated by the catarrhal symptoms which accompany it. There seems every reason to believe, that at those periods when epidemic catarrh or influenza appeared, and of which Sydenham, Huxham, and Baker have given faithful and valuable reports,

some peculiar condition of the atmosphere prevailed.

In like manner, in the autumnal months, the symptoms of gastric disorder form the prominent character of the fever. We have seen also that intestinal affections are not only more common at particular times, but occur in a larger proportion of cases in some localities than in others. This evidently arises from some circumstances peculiar to those situations. The effect of terrestrial emanations, rendered virulent by long-continued rains in hot climates, in producing dysentery, has been remarked by many writers and army-physicians.

We shall next consider how far morbid states of the blood are to be regarded as exciting causes of fever.

The ancient writers ascribed with great truth the origin of many diseases to a morbid condition of the blood and humours; and though the cultivation of anatomy has led to the investigation of the solids as the great source of diseases, yet that many arise from a morbid state of the blood is admitted even by the warmest adherents of solidism.

No one doubts that scurvy depends on vitiation of the blood in consequence of improper diet or living in an unwholesome atmosphere, and that in its progress (whatever cause may have produced the alteration in the blood) various local diseases take place; shewing, as Andral remarks, " that many lesions, apparently inflammatory, are far from depending simply

on a local morbid state, but being connected with certain conditions of sanguification, can be removed only by a return of that process to its natural condition."

Sir John Pringle mentions a remarkable fact which came under his personal observation, of a person being seized with dysentery by making experiments upon human blood, which had become putrid by standing some months in a close phial.

M. Gendrin injected one ounce of blood, drawn from the veins of a patient labouring under putrid fever, into the cellular tissue of the groin of a cat. Copious vomiting, dyspnœa, small, frequent, irregular pulse, dry brown tongue, great prostration, and slight convulsions before death, were the effects which followed this experiment. The animal died within seven hours after the operation.

Duhamel has related the case of a butcher who suffered from a most malignant disease, and which proved fatal in four days, from putting into his mouth the knife he had employed in slaughtering an ox that had been overdriven. An innkeeper wounded himself with a bone of the same ox in the palm of his hand; the arm mortified, and he died in seven days. In two women who had received some drops of the blood of the same animal, the one on her hand, the other on her cheek, the parts to which the blood was applied were seized with gangrenous inflammation.

It is well known that specific febrile diseases, small pox, and even measles, can be

produced by inoculation; and that these diseases, as well as the syphilitic poison, may be communicated through the umbilical circulation from the mother to the fetus in utero, while a healthy infant after birth may become affected with syphilis from the diseased milk of an infected nurse. It has also been asserted "that in females who have died during pregnancy from the effects of some deleterious poison, the same specific agent which the mothers had used has been found in the blood taken from the heart of their dead infants."*

In females who are chlorotic, the blood is altered in its physical characters, and is apparently the cause of this singular disease. It is deficient in the solid or fibrinous principle, and consequently it is thin and pale, and scarcely tinges linen. The symptoms in this affection are so general, that we may safely affirm that every organ and function of the body suffers more or less.

It is not uncommon also for leeches to die immediately after they have sucked the blood of some persons. Cases of this kind have been occasionally recorded.† In these cases the presumption is, that some deleterious agent has been mixed with the blood, which has proved fatal to the leeches.

The following is a singular instance of a

* Observations on the Healthy and Diseased Properties of the Blood, by Wm. Stevens, M.D.

† Christison on Poisons.—Medical Gazette, February, 1831.

vegetable poison entering the circulation, and producing no injurious effect on the animal, but afterwards producing fever, and even death in those who use its milk.

A plant, which is called by the natives the *Indian Hachy*, grows in Tennesee, on the banks of the river Cumberland, and in other parts of the western district of the United States of America, and is so poisonous, that a small quantity of the milk of cows that have fed upon it, mixed with tea, produces most violent fever, and in some cases even death. The following account of the disease produced by this poison is given by Dr. Macall:—" After swallowing the milk, the person in a short time suffers from thirst, nausea, vertigo, confused or imperfect vision; vomiting often ensues, succeeded by violent fever, the exacerbations subsiding at irregular intervals. The pulse is extremely variable, sometimes strong and full, at others, tremulous, small, and corded. Constipation, which exists from the beginning, becomes more obstinate towards the third or fourth day. The skin also about this time is more hot and parched, the eyes are red and suffused, there is very great restlessness, and all the secretions are scanty. Towards the sixth and seventh day excessive debility takes place, with very often paralysis of the tongue and other parts; and soon after ensue stupor, cold clammy sweats, convulsive hiccup, and often offensive cadaverous odour, and death."*

* Philadelphia Journal, 1822.

Dr. Haines, in his account of this disease, which the natives call *the trembles*, observes, "that the heart beats with such violence in some cases as to excite horror in the physician and bystanders. When they lay the hand upon the patient's breast, it seems to labour convulsively, and as though it were clogged in its action by a superabundance of blood. The patient feels nothing he can strictly call pain; but the sense of heat, the oppression, the palpitation of the heart, and the violent efforts to vomit, constitute an extreme degree of distress."

It is also stated that the milk and flesh of animals killed while labouring under this disease will produce disease in other animals. Sucking calves, which have had no food but the milk of an affected cow, show the peculiar symptoms, and often die of the disease. Persons also making use of the milk or butter from the same cow have become affected.

In an instance of a whole family becoming sick with this disease, (some of them in a few hours after dining upon a loin of veal,) it was afterwards satisfactorily ascertained that the calf, which was sold in the market by an unprincipled person, laboured under the disease at the time it was butchered. In another instance several persons became severely affected from incautiously eating of a pig, which had been fattened upon the milk of a cow that was known to be affected with this disease: all of the family who ate of it were seized, some of them in a few hours.

These facts lead to the conviction, that many diseases are produced by a morbid state of the blood.

We formerly adverted to the revival of the opinion among modern pathologists, that a certain class of fevers arise from this source. Many writers who have observed the fevers of hot climates, (Warren, Hume, Hillary, Stevens, and others,) describe the altered state of the blood in the ardent malignant fevers, and from the accounts given by some physicians of the fevers of hot climates, it is more than probable that the diseased state of the blood precedes and is the cause of the febrile symptoms.

In the Genesee country (the lake country of the United States) there are extensive swamps, so that in the hot months there are certain localities in which fever prevails extensively. Dr. Stevens states that during his residence in that country he bled several individuals who resided in some of the most sickly places, but who had not yet been attacked with the fever. The blood was very dark in colour, and evidently deranged in its properties.

Dr. Potter, with the view of proving the non-contagious nature of yellow fever, which had been very fatal at Baltimore, observes, "it was remarkable in all cases in which it was deemed expedient to bleed, the blood wore the same general appearances. After a separation had taken place, the serum assumed a yellow shade, often a deep orange, and a

portion of the red globules was invariably precipitated. It occurred to me, that if the remote cause resided in the common atmosphere, the blood of all who had inhaled it a certain time would exhibit similar phenomena. It accorded with the pathology I had conceived to conclude, that all who lived in an atmosphere so inquinated were constantly predisposed, and that an additional or exciting cause only would be required to develope the symptoms in form. To ascertain the appearances of the blood in subjects apparently in good health, I drew it from five persons who had lived during the whole season in the most infected parts of the city, and who were, to every external appearance and inward feeling, in perfect health. The appearances of the blood could not be distinguished from that of those who laboured under the most inveterate grades of the disease. As this experiment might have been considered inconclusive, unless the blood could be compared with that of those who lived in a purer atmosphere, remote from the evolution of miasmata, I selected an equal number of persons who dwelt on the hills of Baltimore county, and drew from them ten ounces of blood. The contrast in the appearances was so manifest, that no cause for hesitation remained. There was neither a preternaturally yellow serum nor a red precipitate: the appearances were such as we find in the blood of healthy subjects. A young gentleman having returned from the western part of Pennsylvania, on the 10th of Septem-

ber, I drew a few ounces of blood from a vein on that day; it discovered no deviation from that of other healthy persons. He remained in my family till the 26th of the month, and on that day I repeated the bloodletting. The serum had assumed a deep yellow hue, and a copious precipitate of red globules had fallen to the bottom of the receiving-vessel. Of the six persons whose blood assumed those indications of the remote cause, four were seized with fever during the epidemic; the other two escaped any formal attack, but complained occasionally of headach, nausea, and other indications of disease. Hundreds who were not confined, and who never took medicine, experienced the effects of the general cause, under a variety of forms, such as nausea, giddiness, headach, constipation, a pale or yellow face, tinnitus aurium, pains in the extremities, and some other light shades of incipient indisposition. In some there were premonitory symptoms of a formal attack; in others they vanished, leaving the subject in his usual health. Many were listless, complaining of universal languor, indisposed to muscular exertion, yet did not surrender to the disease. They were neither sufficiently indisposed to be placed on the sick-list, nor well enough to pursue their ordinary occupations."*

* Memoir on Contagion, more especially as it respects the Yellow Fever, by Nathaniel Potter, M.D. Baltimore, 1818, p. 53.

With respect to the state of the blood in fevers of temperate countries, Dr. Mead says, " Pestilential fevers, in fine, I call all those which are accompanied with some sort of poison. Now of whatever nature this happens to be, it not only infects and corrupts the blood, but seizes upon the subtle nervous liquor. Hence it is, that these fevers act with greater rapidity and violence, and are much more fatal than the common sorts."

Dr. Stoker conceives typhoid or adynamic fever to be generally symptomatic of morbid changes in the physical character of the blood. He states that the crassamentum is dissolved, or broken into fragments, tinging the serum with its colour, which is sometimes of a very dark brown, and sometimes of a greenish hue. These changes he considers to be intimately connected with disturbance or failure of the vital power in the process of sanguification; and that the morbid changes which take place in the blood become, in proportion to their degree, the source of morbid action.*

Dr. Clanny has adopted views nearly similar, from observation of the gradual changes in the blood from the commencement to the decline of fever.† He has shewn the difference in the component principles of the blood according to the stage of the disease, that the blood loses a proportion of its solid ingredients

* Report of the House of Recovery and Fever Hospital, Cork-street, Dublin, 1829.

† Lecture upon Typhus Fever.

as the fever advances, which it afterwards gradually regains as the fever declines. He firmly asserts his belief, however, in these various changes in the blood being the effect of disease in the solids.

The idea, that certain forms of fever originate in a morbid condition of the blood, is further supported by the peculiar symptoms which follow from poisonous wounds in dissection, or in the preparation of putrid game. The symptoms in these cases closely resemble those of typhous fever, and the description given of the effects of introducing putrid fluids into the veins of animals. Whether the opinion of the older writers, that in fevers originating in contagion, the contagious principle alters the properties of the blood, be correct or not, we certainly think the strong analogy in the cases alluded to tends to confirm the supposition of typhoid fevers originating in diseased blood.

There has been much ingenious disputation on the question, whether the alteration in the blood be the cause or the effect of the disease in the solids. It appears probable, if not certain, from what has been advanced, that in a certain class of fevers (typhoid) the blood is primarily diseased, and that certain changes in one or more organs take place as a consequence, or secondary effect. On the other hand, from various circumstances, as well as from some recent experiments (by Dupuytren, Mayer, and Dupuy), it may be inferred that the solids, more particularly the nervous

system, effect most important and sensible changes in the constituent principles of the blood.

On this subject Andral remarks that "no line of demarcation can with strictness be drawn between the blood and the solids. Physiologically speaking, it is impossible to conceive that one of these two parts of the same whole could be modified without the other being so likewise. On the one hand, inasmuch as the blood nourishes the solids, and as, without its presence, they cannot support life, the state of the solids cannot but be influenced by the state of the blood. The chemist might as well say that the nature of a body does not depend on the nature of the elements that compose it. On the other hand, the solids, considered with respect to their relations to the blood, form but two classes; the one contributing to *make* the blood, such as those concerned in the actions of absorption, digestion, arterial circulation, and respiration; the other contributing to *unmake* it, those, namely, concerned in the actions of venous circulation, secretion, and nutrition. No one solid, therefore, can undergo the slightest modification without producing some derangement in the nature or quantity of the materials destined to form the blood, or to be separated from it. Physiology then leads us to the conclusion, that every alteration of the solids must be succeeded by a modification of the fluids. Viewed in this light, there is no longer any meaning in the disputes between the solidists and humorists;

the system appears to constitute but one great whole, indivisible in the state of health as well as in that of disease. The division of the parts of the body into solids and fluids seems to be a distinction of small importance, and one that is not always just, since it ceases to exist in the intimate structure of the organs, in which all the grand vital phenomena take place, and in which also occur all the changes that constitute the morbid state."

It is probable that when certain external agents alter the properties of the blood, and thus induce fever, the changes take place in a very gradual and almost imperceptible manner. If, for example, an individual who has been accustomed to a pure air, be exposed to an unhealthy tainted atmosphere, or to marsh miasms, or if his food be of an unwholesome kind, or insufficient as to quantity, he is observed gradually to droop, to emaciate, and to lose his natural energy: he may for a long time struggle against this incipient form of disease, but at length symptoms of fever become developed. Under these circumstances, it is very probable that the blood has been undergoing gradual changes from the time that the system was first exposed to the causes adverted to; in the one case, the unhealthy atmosphere has altered the qualities of the blood; in the other, the unwholesome kind or scanty supply of food has produced bad chyle, which, by entering the circulation, taints the general mass of the blood.

It would thus appear, that when the various

exciting causes produce fever by their action on the solids, the febrile phenomena take place speedily, while those acting on the blood produce their effects in a gradual, slow, and often imperceptible manner.

CHAPTER VI.

Of the Treatment of Continued Fever: 1. *Treatment of Simple Fever.* 2. *Treatment of Complicated Fever.* 3. *Treatment of Typhous Fever.—Of the Diet to be observed at the different stages of Fever.—Of Convalescence.*

Before deciding on the measures to be adopted in the treatment of any disease, it is requisite that the practitioner should have correct ideas of its nature in order that the principles or indications of cure may be successfully applied.*

In no class of maladies is this more essential than in continued fever, which, we have seen, assumes so many modifications, arising chiefly from the various circumstances in which it originates, and the local inflammations with which it becomes complicated. When those points are considered, it will be evident, that

* Sentio autem, nostræ artis incrementum in his consistere, ut habeatur historia sive morborum omnium descriptio, quoad fieri potest, graphica et naturalis, praxis seu methodus circa eosdem stabilis ac consummata.—*Sydenham.*

the treatment must be adapted to the circumstances of each case. Not only are the precise form of the fever, and the presence or absence of local congestion or inflammation to be ascertained, but the duration of the disease, the age, the sex, and the constitution or powers of the individual—the previous habits or mode of life, the effects of remedies which may have been previously employed, and the character of the prevailing epidemic. Sydenham's remark should ever be imprinted on the practitioner's mind, that the same method which cures in the middle of the year may possibly prove destructive at the conclusion of it; and when he had fallen on the method of treating any species of fever, he was always successful till that species became extinct and a new one arose, when he was again doubtful how to proceed; and, notwithstanding his utmost caution, could scarcely ever preserve his first patients from danger, till he had thoroughly investigated the nature of the disorder.

The ancients entertaining the opinion that the phenomena of fever were the result of certain efforts of the system to expel some noxious agent, observed most carefully the various changes which took place when the symptoms were allowed to run their natural course. They, consequently, watched the spontaneous efforts of the system, and the supposed salutary effects of certain critical evacuations in controlling or removing the various morbid actions. Founding their indi-

cations on attentive observation of the various means by which the system apparently effected a natural cure, they did not attempt to interfere with its operations, but were contented to assist these natural efforts by such measures as they conceived most likely to conduce to this end.

Accordingly, the older physicians attempted the cure of fever by promoting, by artificial means, such evacuations as are occasionally noticed to occur when the disease is allowed to pursue its own course, uninterrupted by the interference of art. The symptoms or evacuations which are observed in the spontaneous resolution of fever, and which physicians have attempted to induce by remedies, are vomiting, diarrhœa, sweating, and hemorrhage.

Another mode of treatment has been proposed on the principle that, as fever is frequently a fatal disease, the attention of the practitioner should be directed chiefly to combat the more dangerous symptoms which arise in its progress; and we confess that, in our judgment, this plan is not only more philosophic, but that which is most successful in practice.

We have just stated the indispensable necessity of ascertaining the form of the fever before the indications of treatment are considered; and, as the measures to be pursued are essentially different, according to the type of the disease, we shall treat of the management of each variety in the order of the description given in the history.

Treatment of simple fever.—In the management of the milder as well as the more severe cases of the common epidemic fever, the practitioner would often be more successful in his endeavours to cut short the disease, or to lessen its duration, were medical aid resorted to on the first feeling of indisposition. It too often happens that the primary stage is altogether neglected; the patient, hoping that the symptoms will pass off, and unwilling to believe that he is seriously indisposed, continues to pursue his usual avocations, until he is compelled by increasing illness to resort to medical aid.

In investigating the symptoms of fever, however apparently mild, the condition of the several organs should, in the first place, be carefully examined by every means within our reach, that we may be certain there is no lurking disease to keep up the febrile excitement. The patient, his relatives, and sometimes his medical attendant, are too apt to suppose, that if there be no pain to attract attention to any organ, there is no local disease going on. A very short acquaintance with acute disease, however, will convince the practitioner that, besides pain, (which in many cases of local inflammation is entirely wanting,) there are other symptoms, the presence of which indicates both the seat and intensity of the local affection. Again, when we find one organ more particularly affected than another, although the disturbance be merely functional, this over-action, which often depends on irritation or congestion, should be watched and

controlled, lest it should pass into inflammation.

Having ascertained the condition of the several organs, and being satisfied that there is no local complication, the modified antiphlogistic treatment is to be adopted. Strict quietude should be enjoined; consequently confinement to bed, or at all events to the horizontal posture, abstinence and cessation from all mental effort, are indispensable; fortunately, indeed, the lassitude and languor which attend the very first approach of fever, render the patient averse to exertion either of body or mind.

In every form of fever, the expediency of bloodletting is to be considered. This remedy is not to be indiscriminately employed; but the circumstances of each case weighed, before the practitioner decides on employing or withholding the lancet. We shall therefore consider the circumstances which should regulate the employment of this remedy, as we treat of the measures to be pursued in the various forms of fever.

In the milder varieties of simple fever, bloodletting is seldom required, unless the patient be of a full habit, or the symptoms indicate unusual excitement. Under these circumstances, a moderate bleeding at the commencement of the disease is often of much service in mitigating the symptoms, and preventing local inflammation. Indeed, there are few cases of the acute fever of temperate countries, in which, at the onset, a moderate bleed-

ing is not advisable; and in the fevers of hot climates, which often run their course with alarming rapidity, this evacuation is indispensable.

Physicians of observation and experience have often remarked the different characters of epidemic fever, and are therefore aware that at one period, or in some epidemics, the type of the fever renders the bold use of the lancet necessary, while at another season, or from some peculiarity in the epidemic, which is quite inexplicable, the system will not bear with safety the bold treatment which the previous epidemic required. The character of the prevailing fever, as well as the stage and symptoms of the case, must determine the propriety of bloodletting, and the extent to which it should be carried. Even when, from the nature of the prevailing epidemic, bloodletting is indicated, it should be restricted to the early stages, unless some symptoms arise in the later periods to require it. This remedy is also to be prescribed with great circumspection when the patient is of a feeble constitution, or advanced in years, of intemperate habits, or if there be chronic visceral disease. In such cases, unless there be symptoms which require bloodletting, the modified antiphlogistic treatment is to be adopted, viz. strict rest, antimonials, and purgatives; and should local congestion or inflammation arise, they are to be arrested by the topical abstraction of blood.

The freedom with which some physicians speculate on the safety of large bleedings in

fever has led to very improper notions on this point of practice. A little experience at the bed-side, and attentive observation of the ever varying circumstances which individual cases of fever present, will soon enable an observing, and what is of more importance, a candid practitioner, to form a true estimate of this powerful remedy. Were every patient who is seized with fever to be bled indiscriminately, without regard to age, constitutional powers, previous habits, and mode of living, and more especially to the prevailing character of the epidemic, many lives would be sacrificed by a remedy, which, when judiciously employed, is an anchor of safety.

The action of full vomiting, by the shock given to the system, and by determining the blood to the surface, being frequently followed by marked relief of the general symptoms, has led to the administration of emetics in the early stage of fever. They are therefore to be employed in cases in which bloodletting is considered unnecessary, or in conjunction with this remedy. There are few circumstances which forbid their exhibition, so that, unless, as sometimes happens, the disease be ushered in by spontaneous vomiting, or epigastric tenderness, the patient be plethoric, or there be determination to some organ, more especially to the head, or marked prostration, a scruple of ipecacuanha, with one grain of tartar emetic, may be given in a draught, and its operation promoted and rendered as little distressing as possible by copious draughts of tepid fluids.

The exhibition of purgatives in fever requires as much discrimination as bloodletting. Before the excellent practical work of our much respected friend and preceptor, Dr. Hamilton, appeared, the minds of physicians were fettered by the fear of debility, one of the supposed direct causes of death in fever, and purgatives were prescribed with great diffidence, lest by their operation the spasm of the extreme vessels, and the consequent debility, might be increased. This venerable physician pointed out, in his admirable work, and illustrated by his practice, the advantages of a more liberal employment of purgative medicines in fever. The successful result of this method of treatment, and the inferences which Dr. Hamilton deduced, tended materially to withdraw the minds of physicians from the erroneous theory of Cullen, and certainly laid the foundation of the more extended views of the nature and treatment of fever which have been recently introduced.

The principles upon which this method of treatment should be employed have been misunderstood. If Dr. Hamilton's observations be studied, it will be apparent, that while he recommends the free evacuation of the bowels in the early stages of fever, he deprecates their indiscriminate administration. After detailing the circumstances which first led to his adopting the treatment of fever by purgatives, he states, " if this be a just view of the case, the plain inference is, that, while purgative medicines preserve a regular state of the body,

they do not aggravate the debilitating effects of fever. The complete and regular evacuation of the bowels, in the course of fever, is the object to be attained. Within this limit, I have had much satisfaction in prosecuting the practice; nor have I, in a single instance, had occasion to regret any injury proceeding from it; for I am not an advocate for exciting unusual secretion into the cavity of the intestines, and for procuring copious watery stools; these, while they are not necessary, might increase the debility so much dreaded."* With these precautions, no class of remedies is more beneficial in relieving the primary symptoms of fever, in preventing the accession of more formidable symptoms, and thus shortening the duration of the disease. In the more advanced stages, however, purgatives are injurious by draining too much from the system through the bowels; it is sufficient that the alimentary contents be expelled; and should the secretions, which ought to be daily inspected, appear to be vitiated, mild aperients, containing small doses of mercurial preparations, should be from time to time exhibited.

We cannot deprecate too strongly the practice of administering active cathartics in fever without reference to the circumstances of the case, and more especially to the powers of the patient. Such indiscriminate use of purgatives

* Observations on the Utility and Administration of Purgative Medicines in several Diseases, by James Hamilton, M.D.

originates in misconception of the principles on which they should be employed. These remedies should not be prescribed merely because fever exists. In some epidemics and at certain seasons, we have seen that there is a tendency to diarrhœa. It is almost unnecessary to state, that under such circumstances aperients are to be withheld, or those only given which tend to correct the morbid secretions.

The doctrines of Broussais as to the pathology of fever have had a salutary influence in checking the abuse of purgatives in the treatment. There is, no doubt, a material difference in the type of the fevers of France compared with those of Britain; there is a greater tendency to gastric irritation, and to those changes in the mucous membrane of the bowels which result from inflammation. We do not, therefore, wonder at the proscription of purgatives by the French physicians, and their extravagant denunciation of the British treatment of fevers. The fact seems to be, that if British physicians were called upon to undertake the treatment of fever in France, they would be less lavish of their purgatives; and on the other hand, after the French physician had seen the character of fever in this country, and thrown aside his preconceived notions and scholastic prejudices, he would acknowledge the utility of the judicious administration of purgatives in the treatment of the fevers of Britain.

The choice of the aperients employed is of less

moment than their due regulation. In the beginning of fever, especially when there is considerable excitement, the more active purgatives, such as calomel combined with rhubarb, or senna with a neutral salt, may be given. Afterwards, such as ensure a full evacuation of the bowels, according to the indication to be fulfilled, are to be employed. In cases in which purging is required, we have found a powder, containing three grains of calomel, two of James's powder, and eight of rhubarb, given at bed-time, during the stage of excitement, answer every purpose; and if a more free action of the bowels be necessary, half an ounce of castor oil, or an aperient draught, may be given in the morning. When the skin becomes cool, and the tongue begins to clean, the calomel and antimonial powder may be omitted, and the regulation of the bowels managed by rhubarb, castor oil, or senna, so as to ensure one or two moderate evacuations daily, while any symptoms of fever remain.

Sometimes the stomach is so irritable that ordinary aperients are rejected, and even increase the irritation; in such cases the bowels are to be opened by injections, by which the large intestines are unloaded, and the peristaltic action of the upper part of the alimentary canal is promoted.

When the fever is fully developed, the skin becomes steadily warmer than natural, especially towards the evening. The abatement of the febrile heat being generally followed by marked relief in the symptoms, and in the

patient's general sensations, various means are employed with the view of reducing it. Those means which induce perspiration have been employed with this object.

This attempt to imitate nature was strongly inculcated by Cullen. Spasm of the extreme vessels being the supposed cause of the phenomena of fever, it was imagined that every measure which tended to diminish or remove this state of the cutaneous exhalents would have the effect of subduing the disease. Upon these grounds, the employment of diaphoretics in fever was suggested, and these remedies now constitute a part of the treatment of all febrile diseases.

It should, however, be observed that, although a spontaneous or natural diaphoresis has always a salutary effect in reducing not only morbid heat, but the other febrile symptoms, and occasionally accompanies the crisis of fever, the same relief is scarcely ever observed to follow diaphoresis induced by artificial means; and if it be attempted by stimulating or healing drugs, or confining the patient to a warm room, and loading him with bed-clothes, the febrile symptoms, instead of being allayed, are increased. If, however, moisture of the skin can be promoted by saline preparations, such as the acetate of ammonia, with antimony or ipecacuanha, assisted by tepid diluents, the morbid heat of the skin is generally reduced, and the feelings of the patient and general symptoms are ameliorated.

The employment of refrigerants is another

mode of diminishing the morbid heat of the skin in fever. Various internal remedies are prescribed with this view. The mineral and vegetable acids being useful in quenching thirst and cooling the surface, either may be employed according to the feelings of the patient; the most agreeable and convenient form of the latter is, the native vegetable acids contained in fruits, such as the lemon, orange, and tamarind. These may be taken in moderation if they agree, or the bowels be not purged. Sometimes the saline refrigerants, such as the citrate or the nitrate of potash, are employed in preference to the acids. Not unfrequently the patient has a desire for cold drinks; the most grateful during the first few days of the fever being cold spring water, which, if preferred, may be freely allowed, and the diluted sulphuric or nitric acid occasionally added.

Very little dependence however should be placed on diaphoretics or refrigerants; their efficacy is very doubtful, while they often seduce the practitioner from more active measures.

A more effectual mode of reducing the morbid heat is by the free external application of cold. The admission of cool air is of much importance in all acute diseases, but more especially in fever. Those who are conversant with the treatment of fever among the poor are well aware of the favourable changes in the symptoms which are often rapidly produced, after patients are removed from their filthy abode to a well ventilated chamber, or to

the ward of an hospital. The whole complexion of the disease is frequently altered in a few hours. In every case of fever the temperature of the apartment should be duly regulated; the air renewed from time to time, the linen (both of the bed and of the patient) should also be frequently changed (once a day if practicable), and the bed-clothes adapted to the heat of skin and feelings of the patient.

A more direct mode of applying cold in the treatment of fever is the application of cold water. Though this practice appears to have been known to the ancients, and to have been occasionally employed in modern times, it was not generally adopted as a remedy in the treatment of fevers till Dr. William Wright, formerly of the Island of Jamaica, published an account, in the London Medical Journal for 1786, of the successful treatment of some cases of fever by the ablution of the patient with cold water. He first adopted this practice in his own case, and states that he was encouraged to try it from personal experience of the effect of cool air in mitigating his pains. He succeeded in arresting the progress of the fever after twice applying the cold affusion. The successful issue of this case induced other physicians to give the plan a fair trial. To the late Dr. Currie, of Liverpool, however, is due the merit of having first attempted to regulate this practice from accurate observation of its effects.

When the cold affusion is to be employed, it is proper to ascertain with accuracy the tem-

perature of the patient. The instrument best adapted for this purpose is the mercurial thermometer with a small bulb, and curved at the end. The bulb is to be introduced under the tongue with the lips close, or under the axilla, the heat in these two situations being found by experiments to correspond exactly with, and to give a just indication of, the heat of the surface of the body.

The mode of applying the cold affusion is to have the patient stripped naked, and three to five gallons of water, at the temperature of 40° to 60° (Fahrenheit), thrown over him. The temperature of the water, however, must depend on the season of the year. The average temperature of water may be taken from 40° to 50°—during the summer months it varies from 60° to 70°. The degree of cold, however, is of less consequence in abating the symptoms than is generally supposed.

Water alone may be used, or vinegar or common salt may be added. There may be some slight advantages in the addition of these ingredients; Dr. Currie was of opinion that salt water, besides being more grateful to the feelings of the patient, might be applied to the surface for a length of time with much less hazard. This may be true, but we apprehend the chief advantage of the application of cold in any form, is the rapid abstraction of heat, and the sudden, general, and powerful shock given to the whole system, which induces a sudden salutary re-action.

The effect of the cold affusion, when it is

applied with due precaution, is to diminish the morbid heat of skin, lower the pulse, and to induce perspiration and sleep.

As a general rule, the sooner the affusion is applied after the irregular chills of the first stage is over the better, provided the heat of skin is steadily above the natural standard. According to Dr. Currie, the safest and most advantageous time is, when the exacerbation is at its height, or immediately after its declination is begun. The heat at this period rises one or two degrees in the central parts of the body, and still more on the extremities, above the average heat. Dr. Currie, therefore, generally directed its employment from six to nine in the evening, though it may be safely used at any time of the day under proper regulations.

The following precautions are recommended by Dr. Currie, when the cold affusion is contemplated.

1. This remedy should never be used when there is any considerable sense of chilliness, although even the thermometer indicate a morbid degree of heat. If the affusion of cold water on the surface of the body be employed during the cold stage of the paroxysm of fever, the respiration is nearly suspended, the pulse becomes feeble and fluttering, and of incalculable frequency, the surface and extremities are doubly cold and shrivelled, and the patient seems to struggle with the pangs of instant death. Under such circumstances, as Dr. Currie states, the repeated

affusion of a few buckets of cold water would extinguish life.

2. Neither ought the cold affusion to be employed when the heat, measured by the thermometer, is less than, or equal to, the natural heat, notwithstanding the patient feel no sense of chilliness. This is sometimes the case towards the last stages of fever, when the powers of life are weak.

3. It is also necessary to abstain from the use of this remedy when the body is under profuse sensible perspiration, and this caution is more important in proportion to the continuance of this perspiration. In the commencement of sweating, especially if it have been brought on by violent exercise, the affusion of cold water on the naked body, or even immersion in the cold-bath, may be hazarded with little risk, and sometimes may be resorted to with great benefit. After the sweating has continued some time and flowed freely, especially if the body has remained at rest, either the affusion or immersion is attended with danger, even though the heat of the body at the moment of using it be greater than natural. Sweating is always a cooling process in itself, but in bed it is often prolonged by artificial means, and the body prevented from cooling under it to the natural degree by the load of heated clothes. When the heat has been thus artificially kept up, a practitioner, judging by the information of his thermometer only, may be led into error. In this situation, however, Dr. Currie states that he has observed

that the heat sinks rapidly on the exposure of the surface of the body even to the external air, and that the application of cold water, either by affusion or immersion, is accompanied by a loss of heat and a deficiency of reaction which are altogether inconsistent with safety.*

According to the experience of Dr. Currie, if employed on the first or second day with the precautions recommended, the progress of the fever is often checked; but it is seldom successful when applied so late as the third or fourth day, though when administered about the eighth or tenth day, or even later, it moderates the symptoms and shortens the duration of the fever.

When the fever is advanced, the heat of the water should not be more than 15° or 20° below the heat of the body. Indeed, when the patient is weak, or when the fever has run on to the ninth or tenth day, sponging the body with cold or tepid vinegar and water is preferable to the cold affusion.

The advantages of the cold affusion in the acute or inflammatory forms of fever have been acknowledged by almost ever writer or practitioner who has adopted the practice. Our own experience of it certainly accords with that of others as to its efficiency in reducing the febrile heat and moderating the symptoms. We freely confess, however, that there are few patients who can be induced to

* Currie's Medical Reports.

submit to a remedy so inconvenient and so repugnant to their feelings; and unless the practitioner can shew urgent reasons for its adoption, he will generally find both the patient and relatives resist the practice. We have certainly never had the opportunity of witnessing a single case out of a considerable number, to which the cold affusion was applied, in which the fever was cut short, though all the patients felt afterwards greatly relieved, and in some the duration of the fever was probably shortened. The practice is best adapted to inflammatory fever (synocha) and more especially to the fevers of hot climates, which are accompanied with much greater excitement than those of temperate countries. It should, however, be ascertained in every case, before such a powerful remedy is administered, that there is no visceral inflammation: were such a powerful shock given to the system under such circumstances, dangerous and even fatal consequences might ensue.

We are, for the reasons stated, disposed to recommend in preference the cold sponging or washing of the surface, either with cold water or with vinegar and water, whenever the skin is decidedly hotter than natural. This mode is easily applied, gives the patient no fatigue, and checks those irregular feelings of heat, especially in the palms of the hands and soles of the feet, which are so annoying to the patient, besides, what is of some consequence, producing no alarm. It may not, we admit, be so permanent in its effects as the cold affusion, and

certainly cannot be expected to cut short or even to moderate the duration of the fever, but as a grateful means of relieving morbid heat, reducing the pulse and tranquillizing the patient, we submit that it is equally efficacious. This circumstance, with the advantages already stated, has always led us to give the cold sponging a decided preference to the cold affusion.

Dr. Currie applied the cool affusion in cases where, from the continuance of the fever or the debility of the patient, the cold affusion was inadmissible. The temperature of the water employed for this purpose should be from 75° to 87°. It is, however, liable to so many objections, and has so few advantages, that in the present day it is almost entirely abandoned.

The warm or tepid affusion (from 87° to 97° Fahrenheit) has been proposed in feeble habits, and when the heat is little above the natural standard; and, according to Dr. Currie, the heat is lowered as speedily by the tepid as by the cold affusion; indeed, he asserts that in some cases the heat is more speedily lowered by tepid water. The tepid affusion is applicable to every case of fever in which the cold affusion is recommended. Its effects, however, are less permanent than those of the cold affusion, besides that it is admitted, even by Dr. Currie, that it never succeeded in shortening the duration of the fever; so that, from the fatigue and inconvenience attending its application,

and its doubtful utility, it is now scarcely ever recommended.

Washing or sponging the body with tepid vinegar and water is much employed to reduce the morbid heat of fever, and certainly, so far as the feelings of the patient are to be consulted, it is decidedly more agreeable than the application of cold. Some patients prefer cold, others tepid sponging, the former being more grateful in the summer, the latter in the winter months. The choice may, therefore, be left to the patient, either mode of aspersion being preferable to the affusion.

The effect of mercury as an alterative, improving the secretions in fever, is so beneficial, that unless there be some special circumstance in the case to forbid its administration in fever, it should never be omitted, more especially in the fevers of warm climates, or in the more acute forms of fever of temperate countries. The large quantities of calomel (ten grains every three hours) mentioned by Chisholm and other writers, as necessary in the fevers of warm climates, are never to be attempted in the treatment of the fevers of this country. Mercury is more especially useful when the tongue is much coated, the secretions of the mouth clammy and unpleasant, and the stools dark and offensive. It is frequently alone sufficient to regulate the bowels, while at the same time the tongue becomes more clean, and the clammy disagreeable state of the mouth disappears under its use. It is not necessary to push its administration so as to induce sali-

vation, a mild action on the gums being all that is required. When this is effected, the febrile symptoms generally abate. It may be given alone or in combination with an aperient, though we prefer giving two or three grains of the pil. hydr. or the hydargyrum cum creta, at intervals of six or eight hours; and should an aperient be required, it may be combined with the mercurial preparation, or given alone, according to circumstances. In some individuals mercury induces such irritation as to forbid its internal administration; in such cases it should be exhibited in the form of inunction: a dram of the ung. hydr. may be inserted once a day in the axilla, where absorption goes on rapidly without the inconvenience of friction.

We have often observed the singular immunity of persons under fever from the effects of mercury. This is proved from their resisting this remedy during the continuance of the fever; but as soon as the fever begins to disappear, the mercurial action often becomes perceptible; indeed, patients who could bear the free exhibition of mercury during the fever, but in whom the remedy had been discontinued, are often easily affected by an inconsiderable quantity of this mineral in the period of convalesence.

We have stated our belief that synocha, or inflammatory fever, is rarely observed in this country, the few cases which occur (generally in the spring) forming a comparatively small average proportion of the ordinary epidemic fever of Britain.

In the treatment of this variety, it is necessary to keep in mind, not only the more acute nature of the fever, but the greater tendency to local inflammation. It consequently requires more bold and decided antiphlogistic measures, especially bloodletting, purging, and mercury. As it generally occurs in young plethoric persons, bloodletting should always be prescribed in the onset; this not only moderates the violence of the symptoms, but diminishes the tendency to local inflammation.

We have entered at some length into the detail of the various measures which are employed in the treatment of mild fever. It is to be observed, however, that the majority of cases do not require the several measures we have pointed out. It is impossible to lay down a general rule which will apply to every case; in one instance, the mildest measures will be sufficient to check the progress of the fever; in a second, more active treatment, bloodletting, smart purging, and the free application of cold, are necessary; in a third, in addition to these measures, mercury may be required. In short, the application of remedies must be regulated and directed by the judgment of the practitioner, according to the symptoms and the character of the fever.

2. *Treatment of complicated fever.*—A fever, simple at its commencement, (as far as the negative evidence of symptoms warrants the conclusion,) may become suddenly complicated with local inflammation. The symptoms by

which such complications in the several organs may be detected have been pointed out, and although, as a general rule, there can be no question as to the expediency of general bloodletting in complicated fever, it is not advisable to take away the same quantity as in common inflammation. There are modifying circumstances in idiopathic fever on which local inflammation has supervened, so that we find by experience the powers of the patient must be saved for the after conflict, as the fever will certainly run on for some time after the local affection has been subdued.

Dr. Wilson Philip states, "that when visceral inflammation supervenes on idiopathic fever, we must let blood more cautiously than where the former disease exists alone; and in the determinations of blood to particular parts, so apt to occur in fevers, which more frequently consist in distention of the larger vessels of the part than actual inflammation, that is, distention of the capillaries, unless the general excitement is very considerable, it is better to attempt their removal by local than general bloodletting. If there be any exception to this rule, it respects congestion in the head, because, from the nature of the circulation, congestion there is more intimately connected with a state of general excitement than in other parts of the body."

While, therefore, the lancet is to be freely employed if the symptoms demand it, the system is not to be drained of a single ounce of blood more than is absolutely necessary.

The topical abstraction of blood in cases of local inflammation is often very beneficial, and in less urgent cases, sometimes alone sufficient to subdue the local disease. Not unfrequently inflammation creeps on in an insidous manner in feeble exhausted habits; or, as often happens, the local symptoms have been entirely overlooked at the commencement; in these instances general bleeding is inadmissible, and the topical abstraction of blood is the only mode which can with safety be employed. Again, this mode will also often require to be combined with the general measures, or should local inflammation threaten to re-appear, it may be instantly checked by leeching or cupping, and at much less expense to the general powers.

The nervous system being much involved in fever, the brain, but more particularly its investing membrane, the arachnoid, is more liable to become inflamed in its progress than any other organ; the changes which take place in this delicate and important structure being, as we have seen, in many instances, the immediate cause of death. When the symptoms indicate the existence of inflammatory action within the encephalon, no time must be lost in adopting suitable measures. The degree of sensorial disturbance, the presence or absence of pain the existence and kind of delirium, whether of the high or low character, will point out the nature of the cerebral symptoms. If there be pain in the head, flushing of the face, hot skin, thirst, rapid pulse, acute delirium,

(especially towards night,) and watchfulness, we have sufficient evidence of cerebral inflammation to warrant general bleeding, (when there is much excitement from the temporal artery or jugular vein,) followed, if necessary, by the local abstraction of blood from the forehead or nape, and a cold lotion to the scalp.

Another remedy of great power in subduing inflammation of the brain is the affusion of cold water on the scalp. This has been generally termed *the cold douche*. It is as simple in its application as it is powerful in its effects. The patient is raised in bed, the head is then held over an empty vessel, and cold water from a large jug poured on the scalp, the stream being gradually raised as the patient can bear it. A considerable shock is at first produced, but the patient, if he be sensible, expresses great relief, and generally requests it may be repeated. We have frequently seen threatened renewals of cerebral inflammation promptly checked by this treatment, which should always be employed, in some cases as an auxiliary to the other measures, or it is often alone sufficient to keep down the inflammation in weak habits, or when the further abstraction of blood is of doubtful propriety.

The application of blisters to the scalp in cerebral inflammation requires consideration. The too common plan of blistering the head in such instances, before the excitement is diminished by bloodletting, is reprehensible. The application of blisters to the head in fever

should be confined to those cases in which there is danger of the inflammatory action terminating in effusion, or to that particular state of the brain in inflammation, which, though there be no effusion, is attended by coma. Hence when, notwithstanding depleting measures have been judiciously applied, the patient becomes drowsy and insensible to surrounding objects except when roused, a blister may be advantageously applied to the occiput, while an iced evaporating lotion is kept on the forehead, and the system brought under the influence of mercury conjoined with digitalis and squill, so as to promote the action of the kidneys.

There is a form of low delirium in fever which requires to be distinguished from that arising from inflammation of the brain or its membranes. It arises from some peculiar condition of the brain with which we are unacquainted, and may be distinguished from the acute form of febrile delirium, by the pallor of the face, the bloodless appearance of the conjunctiva, the softness of the pulse, the cool state of the scalp, and the absence of muscular twitchings. It occurs chiefly in feeble exhausted habits, and frequently in persons who have suffered large losses of blood in the treatment. In other instances it may be traced to intestinal irritation, or some of those lesions in the bowels which so frequently accompany continued fever. This sympathetic delirium is not relieved, but invariably increased by the abstraction of blood. It is best managed by

small quantities of nourishment and opiates, with a blister to the nape.

A similar state of the nervous system is often observed towards the termination of other acute and chronic diseases, and also in states of exhaustion induced by injudicious blood-letting or spontaneous hemorrhage.

No class of medicines is more efficacious in removing cerebral inflammation than purgatives; so that, unless there be some special circumstances to forbid their employment, they should form part of the treatment in such cases.

When we have succeeded in arresting the cerebral inflammation, the patient must be strictly watched for some days, as the fever, though moderated, is not extinguished, so that the capillaries are very liable to resume the same action, and thus renew the local disease.

Bronchitis is the most frequent form of pulmonary disease in fever. It is in general easily detected, unless it assume the latent form, when it can only be recognized by auscultation. In severe cases of fever, more especially when the brain is much affected, the frequent application of the stethoscope is indispensable, in order to discover not only the existence but the intensity of this complication. The milder forms of symptomatic bronchitis subside under the use of the measures employed in the general treatment. It is occasionally necessary in addition to apply a few leeches to the chest, and to allay the cough by demulcents.

In more severe cases more active treatment is necessary. General bloodletting possesses less control over this complication than might be expected. More benefit is derived from cupping or the application of leeches to the chest, with warm fomentations diligently applied at intervals of two or three hours. The local bleeding is to be followed by antimonials and a blister. If the bronchitis be not arrested by these measures, large doses of the tartrate of antimony are to be administered. To the efficacy of this remedy we can bear testimony from ample experience. One grain, or in more severe cases, two grains of tartar emetic dissolved in an ounce of any aromatic water, may be taken every two, three, or four hours, according to the exigency of the case. The remedy almost invariably produces vomiting at first, (unless there be considerable torpor from the condition of the brain,) but after three or four doses have been taken, the vomiting ceases, and *tolerance* becomes established. In general this remedy moistens the tongue, and produces softness of the skin, or even diaphoresis; it often, however, produces no sensible effect, except that the bronchitis abates and gradually disappears under its use. When the more urgent symptoms give way, the same dose may be given at more distant intervals, till the remedy be no longer required.

It is necessary, sometimes, to endeavour to allay the distressing vomiting induced by this medicine. This is frequently effected by giving the dose of the tartar emetic in a

common saline effervescing draught, to which a few drops of laudanum may be occasionally added.

If it produce purging it must be conjoined with opium; and if, notwithstanding this combination, the purging continue, the antimony must be suspended. In all cases, therefore, when the bowels are irritable, this remedy must be withheld, and the pulmonary symptoms arrested by other measures. If, again, the symptoms of fever be accompanied with great prostration, or if after a fair trial it appear to lower the general powers without subduing the symptoms in the chest, it should be at once withdrawn.

When pneumonia supervenes on fever, the treatment is to be conducted on similar principles. General bloodletting is certainly more efficacious in subduing inflammation of the substance of the lung than of the bronchial membrane, though, unless the symptoms be very urgent, we prefer free local depletion, followed by the exhibition of the tartar-emetic as just recommended, or by calomel and opium with counter-irritation. The calomel and opium may be given, in the proportion of two grains of the former and half a grain of the latter, every three or four hours, till the local symptoms are relieved, when it may be given at more distant intervals, and afterwards withdrawn.

Our experience does not lead us to form a very high opinion of the efficacy of expectorants in symptomatic bronchitis or pneumonia. We have, however, observed good effects from the addition of small doses of ipecacuanha wine,

or of the antimonial wine, to the common saline diaphoretic draught. Still we do not place much confidence in this class of remedies. When the patient is unable, from increasing prostration, to expel the expectoration, carbonate of ammonia, in doses of eight or ten grains in almond emulsion, or decoction of senega, appears often to assist its expulsion.

The occurrence of acute pleuritis during fever is by no means frequent; and when it does take place, it is chiefly in the more advanced stage, or during convalescence. The treatment is very similar to that of pneumonia—local bleeding, calomel and opium, blistering, and purging. Tartar emetic seems to possess little influence over membranous inflammation, and consequently is inapplicable to pleuritis.

The more dangerous form of pleurisy is the chronic, the danger arising from its coming on in an insidious manner, without pain, much acceleration of the breathing, or cough. It is not easily recognised even by auscultation till liquid effusion to a considerable extent has taken place, when the dull sound on percussion of the diseased side, the absence of the respiratory murmur, and the peculiar sound of the voice, (ægophonia,) point it out. The effect of curative measures depends on the state of the membrane, and the extent of the effusion. When the fluid is so considerable as to render its absorption improbable, the operation of empyema is the only resource.

It is proper, however, to bear in mind, that in

a considerable proportion of cases of fever, in which pulmonary symptoms predominate, the chest affection is the primary disease, of which the fever is only symptomatic. Many of those cases commence by slow insidious pulmonary inflammation, which, from the comparatively little disturbance it causes, is often allowed to run on until a more acute attack brings the disease under the care of the physician, who has thus to contend with neglected inflammation, over which the most energetic measures too often exert an inefficient control.

When fever is accompanied with symptoms denoting disturbance of the gastric organs, a moderate bleeding from the arm, if the pulse be full, or in less urgent cases, the application of leeches to the pit of the stomach, is often sufficient to allay the irritation. Notwithstanding the relief afforded by bloodletting, it does not appear that the vomiting and epigastric tenderness depend on inflammation, as Dr. Cheyne states that in a case in which considerable tenderness of the epigastrium existed during a great part of the disease, on opening the body not the slightest morbid appearance could be discovered, except a small quantity of bloody serum effused into the cavity of the abdomen, and a very inconsiderable blush in the mucous membrane of the stomach at the cardiac orifice.

When gastric irritation continues during the course of the fever, the plan of treatment recommended in Dr. Cheyne's account of epidemic gastric fever is to be pursued.

We have seen that follicular disease of the intestines, whether primary or secondary, may be going on without being attended by any symptom of gastric disturbance. When, in addition to the ordinary symptoms of fever, the bowels are irritable, and the tongue is morbidly clean and red, or coated at the root, we may infer the existence of gastro-enteritis, or this follicular disease. Our object must then be to prevent, if possible, the destructive changes which take place, whether the intestinal affection be primary, or have supervened in the progress of the fever.

The local abstraction of blood from the surface of the abdomen (particularly from the right iliac region) is to be pursued, to an extent proportionate to the powers of the patient, and the probable duration of the affection. From twelve to eighteen leeches are to be applied, and the abdomen afterwards enveloped in a warm poultice, renewed every two hours. The leeching may be repeated every day, every second day, or at more distant intervals, according to circumstances. The more early the effective measures are resorted to, the greater the chance of preventing the stage of ulceration, which we are convinced cannot be recognized by symptoms. We are aware that Dr. Bright considers the ochry diarrhœa to be diagnostic of intestinal ulceration. We admit that in some cases in which we have found ulceration after death, the stools had this character; but in other instances the greatest variety both as to colour and consistence has been observed; in a few the stools

were solid up to the time of death, and in examining the intestines there was a considerable quantity of solid excrementitious matter.

In the majority of instances, however, the stools are watery, and generally contain a large admixture of mucus. If in this condition of the bowels laxatives are improper, restraining the diarrhœa by astringents is equally injurious, unless the patient become so much exhausted by the frequency of the stools that it becomes a matter of necessity to restrain the purging; but the circumstances in which the employment of astringents becomes requisite, rarely occur.

It is a matter of great doubt to our mind how far this follicular disease, except in its primary stage, can be arrested by any plan of treatment. We are not prepared to deny the possibility of the cicatrization of intestinal ulceration, though we think that when it is extensive, the process of reparation rarely if ever takes place. The indication consequently is, to arrest the primary stage of this disease by local bleeding, and afterwards by a combination of mild mercurials with opium. The mercury is not to be pushed so as to affect the mouth; the evidence of the mercurial action on the gums being all that is necessary. Four grains of the hydrargyrus cum creta may be combined with half a grain of ipecacuanha, or, when the bowels are very irritable, with three grains of the compound ipecacuan powder. Either of these formulæ may be taken every four hours. We have sometimes found, in addition to these

remedies, the chalk mixture with laudanum, or an injection containing a drachm of laudanum, at bed-time, attended with good effects.

Dr. J. L. Bardsley of Manchester informs us, that he has been more successful in this follicular affection with a combination of superacetate of lead and opium than by any other remedy. He recommends three grains of the former with half a grain of the latter every four hours. In some cases he has doubled those proportions with marked advantage. Leeches are to be previously applied to the lower part of the belly, and afterwards blisters, or the tartar emetic plaster, and the strength supported by wine and other stimulants. This gentleman adds, that in one or two cases in which the patient had recovered from ulceration, but had perished suddenly from some accidental acute disease, on examination after death, not only was the site of the ulcerations most distinct, and their form and size defined, but unequivocal cicatrization had taken place.

Dr. Bright considers the employment of tonic remedies a point requiring nice discrimination. "With regard to the administration of tonic remedies, there is not a doubt that they are of essential importance; and that even while evidence exists of much local mischief in the bowels, it will sometimes be necessary both to support and to stimulate the system: looking indeed to the character of the ulcerations, the deep sloughs which they often form, and the dark red inflammation which surrounds them, there would be reason to suppose that such

remedies might be useful: and occasionally the decidedly remittent form which the fever has assumed, has completely removed every scruple, and led to the free exhibition of the sulphate of quinine with admirable effect. At the same time there is more danger to be feared from the early use of stimulants, as long as the system is still able without their aid to support the feeble prostration, than there is risk in abstaining from stimulants a little beyond the period when they might possibly begin to act well. In a general way the system seems capable of supporting itself for a few days under that great degree of prostration which is connected with advanced ulceration of the bowels; and although we cannot determine the exact state of the ulcers in these cases, yet we find that the action of stimulant and tonic remedies is more certainly beneficial after that state of prostration has existed for some time, than when such remedies are administered with a view of obviating or anticipating the first symptoms of collapse: for when administered too soon, they frequently kindle the inflammatory action with redoubled violence, and then it is that the most appalling combination of debility and nervous excitement is seen for one or two days to precede death."*

While we are watching and endeavouring to subdue the intestinal disease, we are not to disregard the complications which arise in the other organs. The brain and nervous system

* Reports of Medical Cases.

are most likely to suffer from sympathetic disturbance, which is to be moderated by leeching, cold lotions, and blistering the occiput or nape.

The diet of the patient forms a most important part of the treatment in this intestinal affection. The blandest nourishment, consisting of milk and water, or thin arrow-root, is sufficient for the early stage. When the patient becomes exhausted, chicken broth or beef-tea may be added in small quantity to the arrow-root; and should stimulants be required, a little wine may be given according to circumstances.

Treatment of typhous fever.—Most physicians who have written on continued fever, though aware of the marked difference between the synochoid and typhoid fevers, have not sufficiently insisted on the modification of treatment which the latter require. It has been too often imagined, that because the symptoms and the morbid appearances observed in the organs after death are scarcely dissimilar, and that other forms of fever do occasionally pass into typhus, the two diseases are identical. Experience, however, informs us that not only the symptoms and progress, but the effects of remedies, are essentially different.

In the milder cases of typhous fever, blood-letting is seldom necessary, and may in general be dispensed with, unless some special circumstance arise to render it expedient; such as severe pain or sense of weight in the head, flushing, intolerance of light, hot skin, and other symptoms denoting a more intense form

of fever. With such symptoms at the commencement, the abstraction of a moderate quantity of blood, especially if the patient be young and of a full habit, will be proper. If, however, the pulse, though rapid, be soft and compressible, the tongue begin early to assume a brown tint, and there be considerable prostration, the loss of blood from the system cannot be sustained.

Should a low form of inflammation in the brain, chest, or abdomen arise, local bleeding, and afterwards counter-irritation, will be the most judicious mode of treatment. The practitioner must, however, be aware, that symptoms in the progress of the disease may render the expediency of general bloodletting a nice question: for instance, inflammation in some important organ may come on suddenly and place the patient in urgent danger. The inflammation may be so acute that local bleeding may fail to arrest it; on the other hand, the complexion of the other symptoms and the duration of the fever may seemingly forbid more active measures. If the local disease be allowed to go on, the fate of the individual is inevitable; if, on the other hand, blood be drawn from the system, when either the powers of the patient, or the experience of the prevailing nature of the epidemic do not warrant the practice, the treatment which the local disease requires may destroy life. The consideration of such a case is most embarrassing, and the result, even under the most skilful management, always doubtful. The rapidity with which the blood flows

from the vein, and its appearance when drawn, will often afford assistance. If, instead of pouring in a continued stream, it comes in drops, notwithstanding the vein has been well opened; moreover, when it coagulates slowly, the crassamentum is thin and soft, and the proportion of serum abundant, it shows that the abstraction of blood is a measure of questionable expediency. In short, though bloodletting has been recommended in typhous fever from the early ages of medicine, we find even its warmest advocates acknowledge that it is occasionally productive of harm. Sydenham states, "Quoties mihi cum ægris res est, quorum sanguis vel per se imbecilior existit (ut fere in pueris) vel justa spirituum copia destituitur, ut in decliviore ætate, atque etiam in juvenibus, diuturno aliquo morbo confectis, a venesectione manum tempero." Huxham also remarked, "that in cases in which the blood was dark coloured and exceedingly soft, the pulse often sinks surprisingly after a second bleeding, even indeed after the first, and in individuals whose pulse indicated the propriety of a second bleeding."

Sir John Pringle affirmed that many recovered from jail-fever without bloodletting, but very few who had lost much blood; and Dr. Monro confesses that he was often obliged to give cordials to support the strength after bloodletting.

The other measures which have been recommended in mild fever may be adopted in typhus. The shock of an emetic is useful at

the beginning, the more so if there be nausea. When the heat of skin is above the natural standard, cold or tepid sponging is grateful, and allays the morbid heat. Frequent ventilation of the room and changes of linen are also very beneficial.

If the skin be dry, diaphoretics are useful; and should at any time spontaneous diaphoresis come on, it is to be promoted. When copious sweatings appear in the advanced stage of the disease, they should not be interfered with, unless they produce exhaustion, when quinine with diluted sulphuric acid, mild nourishment, and cordials, are to be freely given.

The necessity for purgatives will depend on the condition of the bowels. A mild aperient at the beginning is always proper, to remove any accidental accumulation. The mildest kinds, either castor-oil, rhubarb, or senna, may be prescribed for this purpose, and repeated according to circumstances. When the fever is acute, and the powers are vigorous, the expediency of thoroughly evacuating the bowels, and of abstracting from the mass of circulating fluids through the intestinal exhalents, has been already adverted to. On the other hand, indiscriminate purging is most injurious in any form of fever, but more especially in the typhoid. "I have known," Huxham remarks, "a common purge, injudiciously given at the beginning of this fever, immediately followed by surprising languor, syncope, and a large train of other ill symptoms." Besides, from the greater tenden-

cy to inflammation of the mucous membrane and follicles of the intestines in typhus, every source of irritation, and consequently the stimulus of cathartics, should, as much as possible, be avoided.

If these precautions, as to bleeding and purging, are necessary in the early stage, they are more especially so in the advanced; at which period, such aperients as remove unhealthy secretions, without producing watery stools, are to be employed, viz.—rhubarb, magnesia, or castor-oil, with occasional doses of mercurials. It is necessary to examine daily the evacuations from the bowels in typhous fever, that the appearance of the stools may be ascertained. Bloody diarrhœa is always a most alarming symptom in fever, showing a malignant form of the disease. It depends on a loaded state of the capillaries of the mucous membrane; these vessels, partaking of the general debility, are unable to resist the congestion or afflux of blood, and consequently give way to its distending force. The congestion of the mucous membrane, and consequent hemorrhage, may take place without ulceration; but when there is ulceration the blood does not proceed from the open surface, but in the way pointed out, viz.—by capillary exudation. This symptom is best managed by suspending all irritating medicines, and administering occasional doses of superacetate of lead and opium.

When the abdomen is tympanitic, purgatives only increase the distension. Injections

of carminatives give most relief, though it is only temporary. We have found an injection, consisting of equal parts of the mistura assafœtida and gruel very beneficial. As the disease proceeds, it will be necessary to allow, according to circumstances, moderate support—weak animal broths, and perhaps a little wine.

We must admit that in the treatment of fever, wine is too often administered without due consideration of the character of the disease, its stage, and the condition of the several organs. Dr. Wilson Philip observes, "that the difference of opinion which prevails on this subject, has, in a great degree, arisen from physicians having attempted to apply their rules, either for or against it, to all cases indiscriminately. Whereas it would appear that the use of wine in typhus must be almost as much regulated by circumstances as that of bloodletting in synocha. Two general observations, however, appear to me to be warranted, that more or less wine is beneficial in all severe cases of typhus; and that there are few in which large quantities are not injurious." When we see a patient labouring under symptoms of extreme debility, and find them almost uniformly relieved by a large quantity of wine, it is difficult at first view to persuade ourselves that it can be pernicious. But an attentive observer will look beyond its immediate effects, and will often see sufficient reason to doubt the safety of carrying the practice very far. He will find that the temporary excitement

he thus procures, is frequently succeeded by a greater degree of debility than that which the stimulus had removed; and if he perseveres in the practice under such circumstances, the pulse, upon the whole, will gradually become more frequent and feeble, till it ceases altogether."

Wine is seldom necessary in the early stages of fever, nor, as a general rule, at any period of the acute forms, unless, as occasionally happens, unexpected exhaustion come on, or towards the decline of the disease the powers give way. Under these circumstances, a few ounces of wine, if the skin be cool, the pulse soft, and the tongue moist, will frequently improve the condition of the patient.

In determining the propriety of administering wine in fever, the decision may in some measure be regulated by the character of the disease. We have repeatedly alluded to the difference in the type of epidemic fever. This, in our own experience, has been remarkably illustrated in the epidemic constitution of the last three years. In 1829, fever required most decided antiphlogistic treatment, as the records of the London Fever Hospital will prove. In 1830 and 1831, the symptoms assuming a low typhoid form, (which has continued up to the present time,) a more cordial or stimulant treatment became necessary. This shows that the general character of epidemic fever may at times be such as to require a stimulant plan of treatment.

Besides the indications for the administration of wine deduced from the nature of par-

ticular epidemics, there are some special symptoms which render its exhibition necessary.

1. It is sometimes observed, that when a patient in fever has been going on favourably, the pulse becomes suddenly soft and compressible, the skin cool and damp, accompanied with feeling of considerable exhaustion, and desire for wine. With these symptoms, there need be little hesitation in allowing six or eight ounces of wine in the twenty-four hours, at proper intervals.

2. When the symptoms denoting sensorial disturbance,—languor, low muttering delirium, coma, muscular tremor or subsultus, progressively increase; if, at the same time, the patient lose his strength from day to day, the pulse be soft, and the skin cool, wine may be safely prescribed.

3. When the fever assumes the petechial character, more especially if the spots be large and of a dark red or livid colour, wine is indicated.

4. In cases of sudden or unexpected collapse, which sometimes comes on without ostensible cause, though more frequently after bloodletting, protracted diarrhœa, or spontaneous hemorrhage, wine is a most effectual remedy in raising the exhausted powers of the patient.

5. Wine may be necessary to promote the convalescence in particular cases.

Another circumstance with regard to the employment of wine in fever requires to be noticed. Local inflammations not unfrequently arise in

feeble habits, or in the advanced stage of low fever, requiring general or local bloodletting. The treatment necessary to subdue the local disease lowers the general strength: the patient does not rally, but remains stationary, and perhaps loses ground and feels exhausted. In such cases, a moderate quantity of wine, provided the pulse be soft and the skin cool, is followed by excellent effects. We have often been obliged to prescribe the local and even general abstraction of blood for some sudden emergency, and in a few hours afterwards found it necessary to have recourse to the administration of wine. In such cases it should be withdrawn as soon as the powers have been restored.

Dr. Graves is of opinion that when general symptoms indicate the propriety of administering wine and opium in fever, these remedies may be prescribed, although particular symptoms apparently render the propriety of their exhibition doubtful. Dr. Graves thinks advantage may often be derived from wine and opium at an advanced period of fever, when the tongue is coated with dry brown fur, and the teeth and gums covered with sordes—when there is suffusion of the eyes—dry hot skin, heat of the scalp and flushing—a low form of delirium, with muscular tremor and subsultus—sense of weight or pain in the head, not of the acute throbbing character—and rapid, soft, or small thrilling pulse.

When the symptoms alluded to by Dr. Graves are manifest at the advanced stage of fever, we apprehend they arise from some

latent local disease which has not been overcome, or has been partially renewed, and requires the adoption of local remedies suited to its intensity and the powers of the patient. We have admitted that a general stimulus, such as wine, is by no means incompatible with the local measures which are necessary to subdue low typhoid inflammation; and in offering these precautions we feel we are corroborating the opinion expressed by Dr. Graves on this subject. His remarks, indeed, are accompanied with such precautions, as shew he is aware of the necessity of guarding the inexperienced practitioner against the indiscriminate exhibition of wine and opium in fever.*

With respect to the quantity and mode of administering wine in fever, it may be remarked that it is impossible to give any general rule on this subject. The quantity must be regulated by its effects. Some of the older authors prescribed wine apparently without regard to quantity; we find on record cases of typhous fever, in which two and three bottles of madeira or port have been allowed in twenty-four hours. It would appear from these histories, that in certain forms of low fever, the system is nearly insensible to the effects of stimulants. Incredible quantities of wine have been taken by persons unaccustomed to wine without any signs of intoxication, or any other

* Dublin Journal of Medical and Chemical Science, No. 3.

perceptible effect except that of increasing the volume of the pulse, abating the delirium and muscular tremor, and restoring the heat of skin.

In the present day physicians seem less disposed to sanction extravagant doses of wine. Dr. Bateman was not inclined to exceed a pint in twenty-four hours; and enjoined, that after the object with which it is administered has been obtained, this quantity should be diminished or withdrawn, when the first symptoms of over-excitement appeared. The quantity should not be less than four, nor exceed sixteen ounces, in the twenty-four hours, unless under circumstances of sudden and extreme exhaustion, when a larger quantity may become necessary. It should always be given in small quantities, (from half-an-ounce to an ounce,) mixed with water, or some light farinaceous food, arrow-root, sago, or thin panado, the period between each dose varying according to the allowance. It is better to commence with a small quantity, and as the fever advances, or the debility increases, to augment it cautiously, and to watch its effects.

It is necessary also to bear in mind, that the quantity of wine should be regulated by the age and constitution of the individual. Young persons are not only more easily excited than those advanced in years, but in the latter the symptoms requiring the use of wine more frequently occur, and increase more rapidly.

The previous habits of the individual must

also be considered; if he have been accustomed to live generously, and consequently to the use of wine and other stimulants, the allowance of wine must be greater, than in a person whose mode of living is more simple.

If we find that the pulse is quickly raised, the heat of skin increased, and the face becomes flushed, and the patient restless or incoherent, we may consider the quantity is either too large, or that the use of wine is improper. Again, if its effects soon pass off; if the patient, a short time after being stimulated, lapse into his former state of exhaustion, or seem to get weaker after each portion of wine, its longer continuance will be of little avail. On the other hand when there is a gradual and steady improvement in the symptoms, without any marked excitement after the wine has been taken; moreover if the patient relish the wine, and especially if it tranquillize him, we may confidently anticipate that it will be beneficial.

When the purposes for which wine has been given have been accomplished, it should be gradually, not suddenly, withdrawn, and the patient watched; as we have not unfrequently witnessed the train of symptoms, for which wine was first administered, renewed shortly after it has been discontinued.

The particular kind of wine is a matter of less consequence than the quality of that selected. We generally prefer the dry wines; sherry or sound Madeira, which are less likely to disagree than the red wines.

Brandy, largely diluted, is sometimes given

nent in its operation than wine or brandy, has been indicated, this combination has answered the purpose. We have seen it useful also as an expectorant in the symptomatic bronchitis of fever.

Another class of stimulants of a less diffusible character has been employed in the treatment of fever, viz. tonics. Of these, the vegetable tonics have been chiefly employed, more especially the cinchona or Peruvian bark, which, after sustaining more varied reputation than any other remedy in the Materia Medica, was at length admitted to possess superior febrifuge powers to any drug which has been discovered. When first introduced, it was prescribed chiefly in periodic fevers, but soon after acquired equal reputation in the treatment of continued fever. Its indiscriminate administration, however, without regard to symptoms or the period of the disease, has tended to diminish the confidence formerly reposed in its virtues. In the present day it is scarcely employed in the acute forms of fever, unless some particular symptoms arise, or when the fever towards its decline assumes the typhoid character.

Dr. Cullen remarks, that wherever bloodletting is proper in continued fever, bark is always prejudicial. The opinion of Dr. Bateman on this point is exceedingly strong. He states that, in the early part of his practice, agreeably to the doctrine of the times, he resorted to the decoction of cinchona on the

first appearance of languor and debility. The increase of the symptoms was easily imputed to the intractable nature of the disease, or deemed the necessary result of its progress, until it became obvious, from the repeated occurrence of the fact, that the tongue, which had been, on the day before the administration of the bark, moist, and exhibiting a moist or yellowish mucous fur, was on the following morning dry or even brown; that the skin was hotter or more parched, with a flush in the cheek; that the pulse was quicker and harder; the thirst increased, and the sleep more disturbed. Dr. Bateman was so convinced that these symptoms were to be ascribed to the use of bark, notwithstanding the patient had made some progress towards recovery, that he scarcely ever prescribed it even during the stage of convalescence.

Our own experience is, that in the early stage of common epidemic fever, any preparation of bark is decidedly injurious. When the symptoms of fever have completely subsided, no tonic or stimulating remedy is needed, unless the patient be much enfeebled, and the strength slowly recovered. In such cases tonics are sometimes useful, and certainly none of the vegetable class is more powerful than bark in the form of the quinine. But we hold its exhibition in the early stages of fever under any circumstances improper, as tending, by its stimulant powers, to keep up or increase the febrile action in the system; and when there is local complication, it is

evidently so pernicious that scarcely any practitioner can be so ignorant of the common principles on which the treatment of fever should be conducted, as to think for one moment of its administration under such circumstances.

When the fever is of the typhoid form, and the symptoms, as the disease advances, denote failure of the powers, more particularly if the pulse become soft and compressible, the skin covered with petechiæ, and there be tendency to gangrene, bark, in addition to nourishment, wine, and other stimulants, may be given with the best effects. The sulphate of quinine combined with sulphuric acid is the best mode of administration.

Infusions of some of the other vegetable tonics, serpentaria, cascarilla, calumba, &c. have been proposed as substitutes for the cinchona. As stimulants they are less powerful, and when a light vegetable tonic is desirable, the infusion of any of these may be advantageously prescribed, with or without the addition of an aperient, according to the state of the bowels.

Opium and other narcotic substances have been administered in fever with two indications: 1st, as stimulants when the powers are sinking; 2d, to tranquillize the nervous system, and to procure sleep. The use of opium, as a general stimulant in fever, has been abandoned, wine being proved more safe and durable in its effects.

From the stimulant effects of opium it is in-

jurious in the acute forms of fever, more especially when local inflammation exists. In the early stages it is inadmissible, and indeed much discrimination is required to detect the symptoms which indicate its administration. The delirium and wakefulness of subacute inflammation of the brain is best overcome by topical bleeding, and the application of cold lotions to the scalp; and when the morbid condition of the brain on which the want of sleep depends is removed, the patient generally enjoys intervals of refreshing sleep. In other cases, a state of distressing restlessness with obstinate wakefulness remains, exhausting the patient, and adding greatly to the sufferings. If, with these symptoms, the pulse though soft be rapid, the skin cool, the face pale, the tongue moist, and there be no suffusion of the eyes, opium often acts like a charm. If, however, its exhibition be followed by increase of delirium, thirst, and heat of skin, or if the tongue become dry, and the bowels confined, it should be discontinued.

We do not however think, that in every case the opium should be withheld, if the tongue be dry and even furred, as we have often seen this remedy decidedly beneficial when the tongue was in this state, if the other symptoms indicated its exhibition.

Dr. Stokes has proposed the administration of large doses of opium in peritonitis from intestinal perforation. In these cases the usual antiphlogistic treatment is inadmissible, from

the sinking of the vital powers, which rapidly supervenes. When effusion of the alimentary contents through the perforation takes place, the fatal issue is inevitable. In some few instances, nature, as we have already observed, makes an attempt to repair this lesion; adhesion of the bowel, at the point of perforation, to some portion of the intestine, or adjacent viscus, is sometimes formed, and thus effusion into the abdomen is prevented. When this occurs, the peritonitis is limited in extent; and to these cases the administration of opium is well adapted. Dr. Stokes states, that in the treatment, the first indication is to support the strength of the patient, as far as this can be done without injury; the second, to prevent the further effusion in the peritoneal cavity, by endeavouring to induce organization and adhesions of the effused lymph. This latter indication is best fulfilled by time, and by attempting to diminish as far as possible the peristaltic motion of the intestines. For this purpose opium is to be given in repeated doses. Solid opium, in grain doses, or the black drop in doses of five drops, is recommended to be given every second hour till the symptoms of abdominal inflammation abate, after which the dose is to be given at more distant intervals. In one case, though unsuccessful, this treatment afforded decided relief. Sixty drops of the black drop were given in the twenty-four hours. In another, in which recovery took place, one hundred and five grains of solid opium (exclusive of anodyne injections) were administered without the patient expe-

riencing any of the usual effects of this remedy when exhibited in large doses.*

We think this suggestion of Dr. Stokes valuable, even in those cases in which the fatal issue is inevitable, in consequence of rapid and extensive peritonitis from effusion of the contents of the bowels into the abdominal cavity; it is the best palliative mode of treatment; and in partial peritonitis, when nature attempts the reparative process, it gives the patient the best chance of recovery.

The form in which opium is prescribed is a matter of less moment than a correct knowledge of the circumstances which indicate or forbid its employment. We have found a full dose of solid opium, (one or two grains,) answer every purpose. But we certainly prefer the acetate or the muriate of morphia, in doses of half a grain dissolved in distilled water. Some physicians prefer minute doses of opium at certain intervals, so as to keep the nervous system under its influence. We have tried this mode, but deem it less efficacious than a full dose administered at once.

The other narcotics—hyoscyamus—camphor—cicuta, are very inferior in efficacy to opium. They may, however, sometimes be advantageously combined. The extract of poppy, in doses of eight or ten grains, is often a pleasant opiate. We have also found fifteen or twenty grains of camphor, combined with a quarter of

* Dublin Journal of Medical and Chemical Science, May 1832.

a grain of acetate of morphia, an excellent formula.

The practice of applying blisters in fever was adopted by the older authors to produce a stimulating effect in the advanced or sinking stage of the disease. There can be little question of the effect of rubefacients and vesicants in exciting the system in phlogistic states, but we apprehend their efficacy in rousing the vital powers when the nervous system is oppressed is very questionable, and that, consequently, their value as general stimulants is doubtful.

Blisters and rubefacients are, however, applications of great utility in the local inflammations which occur in fever. They may be employed with this view as auxiliaries to other antiphlogistic measures; or in cases when the vital powers are so low that even local bloodletting cannot be adopted, they may be applied at once, as near the inflamed organ as possible, with the best effects.

Blisters are not, however, to be prescribed without discrimination, as injurious consequences often arise from their injudicious application.

In the acute forms of fever with local inflammation, they should never be employed till more active measures have been adopted. When the capillary congestion has been reduced by local or, if necessary, general bloodletting, should pain or any other symptom indicate that the local affection has not been wholly subdued, the application of a blister to the neighbourhood of the inflamed organ

will often remove the disease. If it be applied without this precaution, it will invariably increase the very action it was intended to subdue. Even with the circumspection recommended, we have repeatedly seen the local disease renewed by the stimulus of a blister. It is, therefore, by no means always safe to adopt counter-irritation in the more acute forms of fever, notwithstanding the too common practice of at once applying blisters on the first appearance of local inflammation, without the precaution of previous depletion.

In the inflammations which arise in typhoid fevers, blisters are excellent local remedies, and we certainly think they are more useful in this than in any other form of the disease. In the low kind of cerebral inflammation, with tendency to coma, after leeching, the application of a blister to the occiput, with a cold lotion to the anterior portion of the scalp, is followed by the best effects. Some physicians think that in these cases a sinapism or a blister to the lower extremities is of great service, and explain the efficacy of these applications on the principle of revulsion. We have certainly seen excellent effects result from them.

Cases are recorded in which boiling water has been applied to the extremities with the object of producing sudden and powerful revulsion in severe cerebral affection in fever. In extreme cases this may be adopted, but from the severity of the measure it can never be generally pursued.

In the secondary pulmonary affections which

frequently arise during fever, local bleeding by leeches or cupping, and afterwards blistering the chest, is the best mode of treatment. When the symptoms have been overlooked on their first appearance, or when the strength will not admit of any form of bloodletting, counter-irritation is the only local treatment that can be employed.

In the chronic stage of the intestinal disease to which we have so often adverted, blistering the abdomen is decidedly beneficial. This practice is however by no means applicable to the acute stage of gastro-enteritis; indeed the application of a stimulus so powerful would inevitably increase the inflammatory action.

It is necessary to bear in mind, that in the typhoid forms of fever blisters do not always heal kindly. The blistered surface, assuming an unhealthy aspect, gradually degenerates into a troublesome species of ulceration, which keeps up feverish irritation in the system. When blisters either do not rise at all, or become troublesome ulcers, it is always an indication of a dangerous fever. We have certainly seen the fatal issue hastened by the effects of a blister.

With regard to the milder forms of counter-irritation, we have seen, in slight cases of local disease, sinapisms very useful. The epigastric tenderness with irritation of the stomach which occasionally appears in the early stage of fever, is often at once removed by the application of a mustard poultice to the epigastrium.

In the gastro-enteritis of fever, cloths soaked in oil of turpentine, and kept constantly on the abdomen, have been applied in order to produce counter-irritation and revulsion. When circumstances prevent the use of blisters, this application may be substituted, though it is much less powerful than either mustard or cantharides.

In all cases of fever, more especially with cerebral affection, it is exceedingly important to examine the state of the bladder. When there is retention of urine, the catheter should be employed. The practitioner requires also to be vigilant when the urine is passed involuntarily; in these instances, from the paralysed state of the muscles concerned in the expulsion of urine, the bladder becomes distended, its muscular coat ceases to contract on its contents, and from a small quantity being occasionally voided involuntarily, the medical attendant is apt to be satisfied with the report of the nurse, that there is no accumulation in the bladder. The tympanitic enlargement of the abdomen may prevent the distended bladder being felt, so that in these cases the catheter should be occasionally introduced to ascertain the state of this organ.

We have already alluded to the revival of the theory, that a vitiated state of the blood is the cause of some forms of fever.

A mode of treatment founded on this view has been proposed by Dr. Stevens, on the supposition, that in fever, but more particularly in the malignant forms, the vitality of the blood

is lessened, and the quantity of its saline ingredients, especially the muriate of soda, ultimately diminished. He considers that the natural saline impregnation of the blood is the cause of its red colour, and that the diminution of its salts is the reason of its black and vapid condition in the last stage of fever.

On this theory Dr. Stevens recommends, after reducing excitement at the commencement by bleeding, purgatives, and other antiphlogistic measures to prevent serious injury to any of the organs, the administration of a sufficient quantity of non-purgative salts, with the object of restoring to the blood the proportion of saline ingredients it has lost. After this has been done, in place of lessening the quantity, it is necessary to remedy the diseased quality of the blood, by correcting acidity, if it be present, by alkaline carbonates, and afterwards throwing into the circulation an extra supply of those stronger salts which act directly on the blood, reddening its colour, correcting its diseased properties, and adding to its power of stimulating the heart.

For a considerable time after Dr. Stevens commenced the saline treatment, he used (except when there were symptoms of acidity in the stomach) a strong solution of the muriate of soda with nitrate of potash; but he has subsequently preferred another combination, consisting of twenty grains of the muriate of soda, thirty grains of the carbonate of soda, and eight grains of the chlorate of potass. This saline powder, dissolved in water, is to be given every two or

three hours (more or less frequently, according to circumstances) in the middle and last stages of fever, and to be gradually left off as the convalescence advances. These salts enter the circulation and do not irritate the stomach and bowels; and according to Dr. Stevens, when given before the stomach has ceased to perform its functions, the bad symptoms soon disappear. A solution of the muriate of soda (two table-spoonfuls to a pint and a half of tepid water or thin gruel) may also be occasionally thrown into the bowels. The strength is at the same time to be supported by strong clear beef-tea.

In extreme cases, or when the practitioner is not called in till the very last stage of fever, Dr. Stevens thinks life may be occasionally saved by injecting a saline solution into the veins.

We have lately adopted this saline treatment in some cases of typhous fever. Our individual experience, however, has been so limited that we are scarcely competent to pronounce an opinion on its value. If the premises advanced by Dr. Stevens be correct, (and we have already expressed our belief that a certain class of fevers do originate in a morbid state of the blood,) the saline treatment he has had the merit of proposing, appears the most likely to correct the vitiated condition of the blood. It should also be observed that Dr. Stevens does not overlook the changes in the solids: when these exist, they are to be treated by active measures, and the saline treatment afterwards adopted.

It would appear, also, that the nitrate of potash, which has been long used as a cooling remedy in fever, may act beneficially on another principle—that of altering the diseased properties of the blood.

It is well known that this salt, when mixed with dark blood out of the body, possesses the power of instantly changing the colour to a bright red; and from its having been used with the most beneficial effects in cases of scurvy, it is reasonable to suppose that it will effect a beneficial change in the blood in malignant fever.

It is proper to add a few observations on the diet of fever patients. The complete disrelish of every kind of food during fever points out the necessity of abstinence; and in cases where, from mistaken views of the supposed advantage of nourishment, food of an improper description is given, the stomach frequently rejects it.

For the first few days the patient generally refuses any kind of food. While the febrile symptoms continue, farinaceous substances, such as the different kinds of gruels—arrowroot, sago, rice, prepared barley, and oatmeal, acidulated with lemon juice, form the most suitable nourishment. A cup of any of these gruels may be given at intervals, and if the patient retain the relish for it, a cup of weak black tea may also be allowed occasionally. We have often observed that thirst is more effectually allayed by weak tea than by any other beverage. Sometimes ripe fruits are grateful, and therefore may be allowed in great mo-

deration, unless there be symptoms of gastric disorder, or such fruits disagree.

When the symptoms of fever abate, more particularly when the tongue begins to clean, and the appetite to improve, a portion of stale bread or water biscuit should constitute the only additional nourishment, till the fever has entirely disappeared. The weak animal broths may then be substituted for the farinaceous food; and of these the quantity should at first be moderate, that the stomach may not be oppressed.

In the course of three or four days a little solid animal food, plainly dressed, may be allowed, unless there be special circumstances to forbid it. The quantity of animal food should not exceed three ounces at first, and mutton, from its being more easily digested, should be preferred. If the patient feel any uneasiness after it has been taken, it must of course be omitted, and beef-tea or mutton-broth again for a time substituted.

When the patient has been much reduced, more particularly if there be a natural delicacy of habit, one or two glasses of sherry wine, mixed with water, may be taken during the day; but, in general, in convalescence from common epidemic fever, wine or fermented liquors are not required, unless the powers are feeble, or the patient has been accustomed to their daily use. As a general rule, nourishment may be given more early in typhus than in the acute forms of fever.

Of convalescence.—In no form of acute disease is the management of convalescence of

more importance than in continued fever; and few persons among the educated—none among the ignorant—can conceive the precision that is required in this particular.

It is too commonly imagined that, when the fever has disappeared, all danger is at an end; that nothing remains to be done but to recruit the strength by nourishing food and imprudent exertion. If the feeble state of every organ in the body, but more especially of those which may have been more seriously affected, and the slow and gradual manner in which they recover their natural vigour, were considered, few would be so careless of their safety as to hazard a relapse which might be fatal.

It is the duty of medical attendants to place these circumstances strongly before the patient, and to impress on the mind the paramount necessity of refraining from every thing that is likely to produce excitement.

In almost every case the practitioner has to contend against the prevailing notion, that the strength can only be restored by nourishment, and even wine. The inherent restorative powers of the system, and the greater safety of leaving nature slowly to effect her own purposes, than to hazard a renewal of the febrile action, or to rekindle local inflammation by acts of imprudence, should be pointed out. When the symptoms have been severe, and consequently the treatment active, more especially when large losses of blood have been sustained, the greater is the danger of relapse. In some instances again, the local inflammation which may have arisen has not been

wholly extinguished, there is a lurking indisposition—a tedious recovery, as it is termed. Such cases, it should be remembered, only require the excitement resulting from indiscretion in diet or prolonged exertion, to reproduce the local inflammation.

In the management of convalescence, therefore, the patient should not be permitted to sit out of bed till the strength be considerably advanced. It is better that restriction should be imposed a little too long, than that any risk of relapse should be run.

The next point is of still greater consequence — the proper regulation of the diet. This has been already minutely discussed, as well as the order in which the food should be changed. We may, however, remark that, in our experience, by far the greater number of cases of relapse take place from indiscretion in diet. It should also be strongly impressed on the convalescent, that it is as necessary to guard against the quantity as the quality of food, particularly when there has been gastric irritation in the progress of the fever. The stomach may be able to digest and assimilate a limited proportion of food; but the indulgence of an extra ounce or two may induce oppression, and a renewal of the fever. This organ in convalescence partakes of the external or muscular debility, and the convalescent may as well expect to be able to carry a heavy load on his shoulders, as to digest an undue quantity of food, even of a suitable kind. Indeed, every practitioner of experience knows, that with the best pre-

cautions, the return to solid animal food is hazardous.

Besides avoiding every source of general excitement, it is necessary to impose restrictions according as the several organs may have been affected. Thus, when the symptoms in the brain have been severe, undue mental effort should at first be abstained from as much as possible. When the lungs have been inflamed, every circumstance likely to produce recurrence of the pulmonary disease must be avoided; and similar precautions, but more especially with regard to diet, are necessary when the gastric organs have been implicated.

Exposure to cold in the winter and spring must be most attentively guarded against. Many persons who have struggled through a most dangerous fever, have, from imprudent exposure to cold, been seized with intense inflammation in some organ, which has rapidly destroyed life: hence the necessity of suitable clothing, and regulating the temperature of the chamber, during the period of convalescence from fever.

THE END.

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